G. R. S. 59]

GENERAL AND REVENUE SECRETARIAT.

19112

(Genl. Misc.)

File No. 210 – 11

Serial Nos. 1 – 20.

Papers Filed.

Month July 1913

SUBJECT.

Invention for Improvements in the treatment of ores by the Cyanide process by Mr. Hugh Mackenzie Leslie Glasson

PREVIOUS REFERENCES.	LATER REFERENCES.

K Ramachandra 23/9/13

R. N. Krishnaswamy 22-8-13

3049

G.R.S.11] 1911–12

GENERAL AND REVENUE SECRETARIAT

(Gen : mis)

NOTES.

Gen File No. 210 11/12

FILE HEADING.

for "Improvements
Invention in the treatment of ores by the Cyanide Process"
by Messrs Hugh Mackenzie Leslie, Metallurgical Engineers, 53,
Waterloo St, Glasgow, Scotland

From

Messrs Remfry & Son, Solicitors & Patent Agents, Calcutta

No. Letter Dated 19 1. 12 Received 22. 1. 12

Diary No. 3049	Enclos. 2	Spare Copies	Serial No. 1

BRIEF ABSTRACT OF LETTER.

Forwards an application ~~for~~ for leave to file a specification of the invention and also a Power-of-attorney and remits Rs 11 therefor

NOTES AND ORDERS.

1/ The sum of Rs 11/- ref^d to above has been received. The usual drafts are subd

24/99
27.1.12 VS. 41 y Issue
29.1.12

NOTES—First sheet

GPB—30,000—3-4-07.

G. R. S. 12]
General and Revenue Secretariat.

G. M File No. 210 of 1911-12

(2)

339

Serial No.	
2.	To. Messrs Remfry & Sons Calcutta No G 4064 dt 8.2.12 Requests that an authenticated copy of the order passed on the corresponding application made in the united Kingdom may be forwarded for reference.
3.	To. The Superintendent of Stamps No G 4065 dt 8.2.12 Encl Re 1 + one Forwards the Power-of-Attorney received vide Sl 1 and requests that the same may be impressed with Mysore Stamp and returned
4	To. The State Geologist. No G 4066 dt 8.2.12. Forwards for report the application received with Sl 1.
5	To. Dy Comr Bangalore. No G 4067 dt 8.2.12 Encl Rs 10/- Forwards Rs 10/- and requests acknowledgment.
6	From the Supdt of Stamps No 107 dt 9.2.12. Returns duly stamped the Power-of-Attorney forwarded with Sl 3

Replies from the others may be awaited.

Subd 13.2.12 VS.41 W

Yes M 13/2/12

NOTE—Contn. sheet.

GPB—50,000—12-8-10

G. R. S. 12]
General and Revenue Secretariat.

Gm File No. 210 of 1911–12

Serial No.	
7	From the D. C., Ttg Deptt, Bangalore. No. 135. dated 13.2.12 Acknowledges the receipt of the amount forwarded with sl 5.
	5) The reply of the state Geologist may be awaited.
	subd 26.2.12 VS.41
	6) Yes to 26.2.12
8	From the state Geologist. No. 1832 d 30.3.12. Forwards copy of letter No. 653 d 26.3.12 from the Inspector of Mines, stating that there is nothing to prevent the applt for leave to file the specifn from being granted.
	7) A reply to sl 2 may be awaited
	subd 10.4.12 VS.4
	13/4/12
9	From messrs Remfry & Son. d 13.5.12 Submits a certified copy of the British Printed Specification of the same invention as called for in sl 2 above.
	8) In sl 8 above, the State Geologist states that there is nothing to prevent the application from being granted.
	Draft subd 21/5 13 BR 9) Issue SPA 31/5

NOTE— Contn. sheet.

GPB—50,000—12-8-10

R. S. 12]

General and Revenue Secretariat.

Gen File No. 210 of 1911

Serial No.	
10	To Mr. Hugh Mackenzie Secretary. No. G 7877 dt 6-6-13 Authorises him to file the specification
11	To Messrs Remfry & Son. No. G 7878 dt 6. 6-13 Forwards the above for comm^n to the party concerned.
12	From the same dt 17. 6. 13. Forwards Rs 30/- and 4 copies of the specification and requests the filing of the specif^n. The appl^n has been received in time. The usual drafts are subd. The certificate at foot of the G.O. (both in the draft and fair) requires signature. Sd/- 27/6/13 NRL Issue SM 27/6
13.	To. The Compiler. G. 296 dt 11-7-13. Notifies the filing of a specification of the invention referred to.
14	To. Messrs Remfry & Son. Calcutta G. 297 dt 11-7-13. Forwards copy of the above and returns Rs 10 with the certificate at foot duly filled in & signed and requests that the same may be communicated to the party Concerned

7129

Gen

P. T. O.

NOTE—Contn. sheet.

GPE—6,000—17-6-12.

R. S. 12]

(5)

General and Revenue Secretariat.

G. M File No. 210 of 1911-12

Serial No.	
15.	To the D.C. Irg. Department, Bangalore G. 2987 11-7-13. Forwards for being credited to the Treasury the sum of Rs 30 received with Sl 12 and requests acknowledgment.
16	To the Chief Engineer, Supdt Museum & State Geologist. G. 299-301/87 11-7-13 Forwards for record in their office a copy of the Specification received with Sl 12 and requests acknowledgment
17	From the State Geologist. No. 158 dt. 12/7/13
18	" the Supdt, Govt. Museum. No. 158-14 7/13
19	" the Ch. Engr. No. 5913 dt. 22-7-13
20	" D. C. Irg Deptt, Bangalore. No. 80 dt 14-7-13.

} Acknowledge receipt of the Specification sent with Sl. 11.

Acknowledges the receipt of the amount forwarded with Sl. 15.

The correspondence may be filed

Subd
19-8-13

NOTE—Contn. sheet.

30649

GENERAL.

(1)

SECTION for this
No. 210 of 1911-12

V
22/1/12 To

THE ~~PATENT~~ SECRETARY, to the Govt. of Mysore,
~~PATENT OFFICE~~, Genl. & Rev. Dept.
~~CALCUTTA.~~ Bangalore,
MYSORE.

FROM

REMFRY & SON,
SOLICITORS AND PATENT AGENTS,
CALCUTTA.

Dated CALCUTTA, the 19th January 1912.

Sir,

"Case A"

We have the honour to forward herewith an Application of HUGH MACKENZIE LESLIE, Metallurgical Engineer, of 53 Waterloo Street, Glasgow, Scotland, for leave to file a Specification under Part I of the Mysore Inventions and Designs Regulation, 1894, in respect of an Invention for "Improvements "in the treatment of ores by the Cyanide Process", and solicit the favour of your submitting the same to H. H. the Dewan.

The Power of Attorney under which we are acting is also forwarded and we request that it be stamped Re. 1/-.

A Post Office Order for Rs. 11/- is sent today. The corresponding British Application is No. 27879/11 and, we believe there is no corresponding Indian Application.

Kindly give this Application a Register No. prior ~~than~~ to the Application in the same name marked "Case B" submitted today.

We have the honour to be,
Sir,
Your very obedient servants,

I.M.B.

1,000.—17-3-11.

(2) Case

A P P L I C A T I O N.

TO THE DEWAN OF MYSORE.

The Application of Hugh Mackenzie Leslie, Metallurgical Engineer, of 53 Waterloo Street, Glasgow, Scotland, for leave to file a Specification under Part I of the Mysore Inventions and Designs Regulation, 1894.

1. The Applicant is in possession of an invention for "Improvements in the treatment of ores by the Cyanide Process"; he is the Inventor thereof; and, to the best of his information and belief, the Invention is new within the meaning of Part I of the Mysore Inventions and Designs Regulation, 1894, and no circumstance exists which, if the Applicant is authorised to file a Specification and files it in accordance with that Part, will disentitle him to an Exclusive Privilege thereunder in respect of the Invention.

The Applicant has applied for a Patent in the United Kingdom in respect of this Invention, No. 27879 dated the twelfth day of December, 1911. See Illustrated Official Journal (Patents) No. 1196 page 1764.

2. The following is a description of the Invention:-

SOLICITORS & PATENT AGENTS REMFRY & SON. CALCUTTA.

In the extraction and recovery of metals from their ores by means of Cyanide it is generally known that a loss of the same takes place, apart from the loss which occurs in the vessels in which the ore pulp is treated, through decomposition, by various agencies, of the Cyanide or Cyanogen compound used, and, as a result of the decomposition, gases and vapours (mainly, Hydrocyanic Acid Gas) containing the Cyanogen Radical are given off from all the vats, precipitation tanks or extractor boxes, filters, etc. used and are lost in the atmosphere.

Likewise, in treating ores by the Cyanide process by any of the known methods, such as agitation, percolation, or decantation, whenever the pulp, mixed with, or in contact with, a cyanogen compound, is exposed to, or is in contact with, the atmosphere a similar loss of Cyanide occurs apart from the amount of this chemical actually consumed in the extraction and recovery of the metal.

The word extraction hereinafter used I apply not only to the dissolving of the metal from its ore but also to the subsequent recovery of the said metal in a marketable form from said solution.

The object of my invention is to effect great economy in the treatment of ores by Sodium or Potassium Cyanide or other Cyanogen compounds by collecting all the Cyanogen containing gases liberated during the treatment and which were formerly wasted in the atmosphere and utilising the same over and over again in the process of extraction of the metal thereby obtaining the maximum effect at the minimum of cost.

In carrying out this invention I cover all, or as many as may be desired, of the tanks, vats, extractor boxes,

machines or places where Cyanogen compounds (Hydrogen Cyanide, Potassium or Sodium Cyanide or other Cyanide) in gas or solution are found, contained, or are used, in, or for, the process of extraction, in such manner as to prevent the said gases escaping or diffusing into the atmosphere. The gases from these covered vessels and (or) places are carried off and conducted preferably to one or more collecting vessels (such as a gasometer or the like) and then to a compressor or pump or the like, the gases being withdrawn, as desired, from the collecting vessel (or vessels) and after being compressed by the compressor being delivered therefrom and again utilized, either alone or in conjunction with air, for agitating or aerating the ore pulp under treatment, the Cyanogen containing gases being thereby again brought into contact with the material on which they act. As will be seen, by this system which I may term a "closed system" the Cyanogen containing gases given off during the stages of the process of extraction are collected and then brought back and forced, under pressure, into the agitators or other vessels in which the ore pulp is being treated. This forcing of what would be otherwise waste gases, back again into the ore pulp vessels goes on, or may go on, continuously, so long as the treatment is being carried out. Of course, if so desired, the Cyanogen containing gases may be collected and thereafter used as and when required.

If so desired, instead of conducting the waste gases first to a collecting vessel they may be conducted directly to the compressor.

Should it be necessary to introduce a base to accelerate the process of dissolution of the metal or for the formation of a soluble cyanide or to assist the precipitation of the metal from solution in the precipitation

tanks or extractor boxes, such agent can be introduced into the agitator or other vessel in which the ore pulp is undergoing treatment as may be found necessary or be added to the solution prior to its passing into the said precipitation tanks or extractors or at any other stage of the process.

In some cases instead of forcing the Cyanogen containing gases into the agitators or other vessels containing the ore pulp the gases may be sucked into and through the pulp by means of a suction pump or other suitable suction appliance.

Theoretically about 4.5 lbs. of Cyanide should dissolve about 100 ozs. of Gold but, in actual practice, it is found that nearly forty times this quantity is required.

Owing to the great loss which takes place it is usual, at present, to increase the strength of the working solutions, from time to time, by the addition thereto of fresh Cyanide. Now, under my closed system, the gases evolved during the process, and which are at present wasted, are collected and again passed into contact with the material and if an alkaline solution is added thereto from time to time then the Hydrocyanic acid in such gases will combine with the alkali and give the same effect as if fresh Cyanide were added, thereby, to a great extent, obviating the necessity for such additions of Cyanide.

The common use of volatile solvents such as Hydrocyanic acid or Ammonium Cyanide or other of the more volatile Cyanogen compounds in their free state or in a simple water solution is not at present commercially possible as, owing to their great loss by evaporation to the atmosphere in open vessels the consumption of these chemicals is very great. Further, the use of such volatile Cyanogen

solvents cannot be carried on with safety to the operators or to any animal life within the vicinity of the plant as the escaping gases are extremely poisonous. Under my closed system, however, Hydrocyanic acid can be safely used for treating Gold Telluride and other Ores, and Ammonium Cyanide for treating, say, Silver ores with very effective and economical results.

In order that the invention may be clearly understood I have, by way of illustration or example, shown at figs. 1 and 2/-2a of the drawings annexed, a suitable construction and arrangement of plant for carrying out the complete Cyanide process according to my closed system.

Fig.1 is a diagram giving a plan view of the plant and fig. 2/-2a is an elevation of the series of agitators.

In carrying out the process according to my system and with plant such as shown at figs. 1 and 2/-2a the pulp from the mill a passes by means of a conduit 1 to a dewatering cone b where the surplus water is removed and the pulp thickened for treatment. The pulp passes onwards by pipe 2 to an agitator c and, in turn, from this agitator c to a second agitator c^1, a third agitator c^2 and a second dewatering cone d from whence by pipe 6 it is delivered to a fourth agitator c^3 then to a fifth agitator c^4 and to a third dewatering cone d^1 and from this, again, it may be delivered by pipe 9 to a sixth agitator c^5 and a final dewatering cone d^2. The pulp is lifted from agitator to agitator by means of lift pipes 3,4,5,7,8,10, and compressed air is used for giving the lift, the compressed air being supplied from compressed air mains 39,45 and 49 to pipes 40^a, 41^a, 42^a, 46^a, 47^a, and 62^a, these latter pipes projecting into the lower ends of the lift pipes 3,4,5,7,8,10. and forcing the pulp up through these pipes. As will be

seen the agitators are arranged in step formation although they may be otherwise arranged if so desired. The pulp is agitated and aerated within each agitator by means of perforated air pipes therein and which communicate with air supply pipes 40,41,42,46,47 and 62. The pulp in the agitators c, c^1, c^2, is acted on by strong solutions of cyanide supplied through solution pipes 29 30, and 31 which latter communicate, by the pipe 28, with the solution pump h and sump g. The pulp, after circulating through the agitators c, c^1, c^2, is delivered to the dewatering cone d where the surplus solution flows over the baffle p and runs off by the pipe 12 to the filter tank e and thence by pipe 13 to the extractor f (where the dissolved metal is removed) and thence, by means of the pipe 14, to the sump g ready for use over again. The thickened pulp from the cone d passes, by the pipe 6, to the agitators c^3, c^4, which are each supplied with a weak solution of cyanide through pipes 33 and 34 which latter are connected, by a pipe 32, to a solution pump h^1 and a sump g^1. From the agitator c^4 the pulp passes to the dewatering cone d^1, the surplus weak solution flowing over the baffle p^1 and passing away by the pipe 15 to a filter e^1 and then, by a pipe 16, to an extractor box f^1 (where any metal is removed) and then, by the pipe 17, to the sump g^1 ready for reuse in the same manner as the strong solution. The thickened pulp from the cone d^1 passes, by pipe 9, to the agitator c^5 where it is agitated in conjunction with water or very weak solution supplied through the pipe 36 communicating with the pipe 35 pump h^2 and sump g^2. The pulp from the agitator c^5 passes to the dewatering cone d^2 the surplus water flowing over the baffle p^2 and passing by the pipe 18 to a filter e^2 and by pipe 19 to the extractor box f^2 (where any

metal still left is extracted) the solution thereafter passing, by the pipe 20, to the sump g^2. The thickened pulp and sand in the cone d^2 may be discharged by the pipe 11 on to the dump or it may be further dewatered by filter pressing, or otherwise, if it is thought desirable to do so.

Instead of the dewatering cones d, d^1, d^2, any other well known and suitable dewatering apparatus may be used and these dewaterers may be introduced after any of the agitators as is found most suitable for the ore under treatment. The number of agitators and dewaterers would be arranged to suit the requirements of the ore under treatment.

All the various agitators, dewatering cones, filters, extractor boxes, and sumps are covered over and the air charged with hydro-cyanic acid from these various places passes to gasometers i, j, j^1, j^2. The first series of agitators have gas connections 55,56,57,54. leading to a gas main 37 communicating with the gasometer j. The second series of agitators have likewise pipes 59,60 and 58 leading to a gas main 43 communicating with the gasometer j^1. The sixth agitator c^5 has gas pipes 62,61, communicating with a gas main 48 leading to the gasometer j^2. The dewatering cones d, d^1, d^2, have also gas pipes connecting with the mains 37,43, and 48, as shown, so that the cyanogen containing gases evolved during the process are carried away by these various pipes to the gasometers j, j^1, j^2. Further, the filters e, e^1, e^2, the extractor boxes f, f^1 and f^2, and the sumps g, g^1, g^2, are also covered over and provided with gas pipes for carrying away the gases evolved to a main gasometer i by means of the various pipes 21,22,23,24,25, 26,27 and 63. This main gasometer i is connected by the pipe 51 and branches 50,52,53, with the gasometers j, j^1, j^2,

(2)

The air and gas in the gasometers can be drawn off, as required, by means of the compressors k, k^1, k^2, and forced into the receivers 1, 1^1, 1^2, and thence by means of the pipe connections 38,44, and 49 to the air mains 39,45 and 49 and the various agitators so as to act upon the fresh pulp therein, the Cyanogen containing gases being thereby used over and over again so long as the treatment lasts. At the initial start of the process the gasometers will be supplied with air alone but as the process continues the air becomes gradually more and more charged with Hydrocyanic Acid and, as the strength of this acid increases, then the strength of the Cyanide solutions introduced into the agitators can be lessened. The Cyanide for strengthening the solutions may, as usual, be added at the sumps. Atmospheric air for use in the process may be admitted to the compressors k, k^1, k^2, as required a valve arrangement being provided for this purpose.

w wherever repeated indicates pulp level.

It will be seen from the foregoing that the whole system is a constantly circulating one and that neither the air used nor the gases evolved during the process are allowed to escape into the atmosphere.

The plant is so arranged, as will be seen, that any one of the series of agitators may be cut out and for this purpose the pipes are supplied with suitable cocks.

Although I have shown gasometers, compressors, and receivers for each set of agitators these may be differently arranged and one or more of the same be dispensed with or added to as desired.

If the cyanide process is carried out on the percolation system then a series of percolating tanks (such as q fig.3) would be used in lieu of the agitators these percolating tanks being of ordinary construction

with double bottoms and a perforated compressed air and gas pipe s arranged below the filter floor r. The pipe s of each perlocator would be connected to its proper main, such as 39,45 or 49 as the case may be, the remainder of the plant being the same as before described with reference to fig.1. Each percolating tank is covered over, as shown, a man-hole door being provided in the cover and the pulp pipe 2, the gas pipe 55, and the solution pipe 29 may be arranged in the cover in the manner shown. t is the usual outlet.

In some cases a single agitator may be used as at fig.4 this agitator being similar in action to the agitator c of fig.1. Instead, however, of providing an air lift in this case a circulating arrangement may be provided the pulp within the agitator being forced by the admission of compressed air through the pipe 40 up the stand pipe u and out at its upper end where it strikes against a dome v and then falls back again into the pulp, the level of which is indicated at w. The pipe 40 is connected with an air compressor as usual and the gasses which are drawn off by the pipe 55 are carried to a gasometer or other suitable vessel and from thence to the air compressor (or they may be passed direct to the compressor) and re-passed through the pulp along with the air.

When the air and Cyanogen containing gases are drawn through the pulp instead of being forced therethrough, tanks, such as shown at fig.3 may be employed in lieu of the agitators, the gases being drawn off by a pump or other suitable exhauster through the pipe 55 and then, along with air, supplied to the pipe s from which they pass through the filtering bottom r and ore pulp, the Cyanogen containing gases being thereby caused to again act upon the ore.

(11)

Having now particularly described the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:-

1. The improvement in the Cyanide process for treating ores, consisting in collecting or drawing off the Cyanogen containing gases liberated during the treatment and bringing these gases again into contact with ore so as to act thereon.

2. In the treatment of ores by the Cyanide process covering the vessels or places where the Cyanogen compounds in gas or solution are found, contained, or are used, in or for the process of extraction, and carrying off the gases from these covered vessels or places and thereafter returning these gases directly or indirectly back again to the agitators (or other vessels in which the ore is being treated) so as to again come in contact with the ore and act thereon.

3. In the treatment of ores by the Cyanide process covering the vessels or places where the Cyanogen compounds in gas or solution are found, contained, or are used, in or for the process of extraction, and carrying off the gases from these covered vessels or places and conducting them to one or more collecting vessels and then to a compressor or pump or equivalent whereby the gases are compressed said gases being then used either alone or in conjunction with air for agitating or aerating the ore pulp so that the Cyanogen containing gases are again brought into contact with the material on which they act.

4. The treatment of ores by the Cyanide process substantially as hereinbefore described with reference to the drawings annexed.

(12)

3. The Applicant, therefore, applies for leave to file a Specification of the Invention pursuant to Part I of the Mysore Inventions and Designs Regulation, 1894.

Hugh A. Lisle.
.....

I, the Applicant abovenamed, do declare that the facts stated in this Application are true to my knowledge, except as to matters stated on information ar belief and as to those matters I believe them to be true.

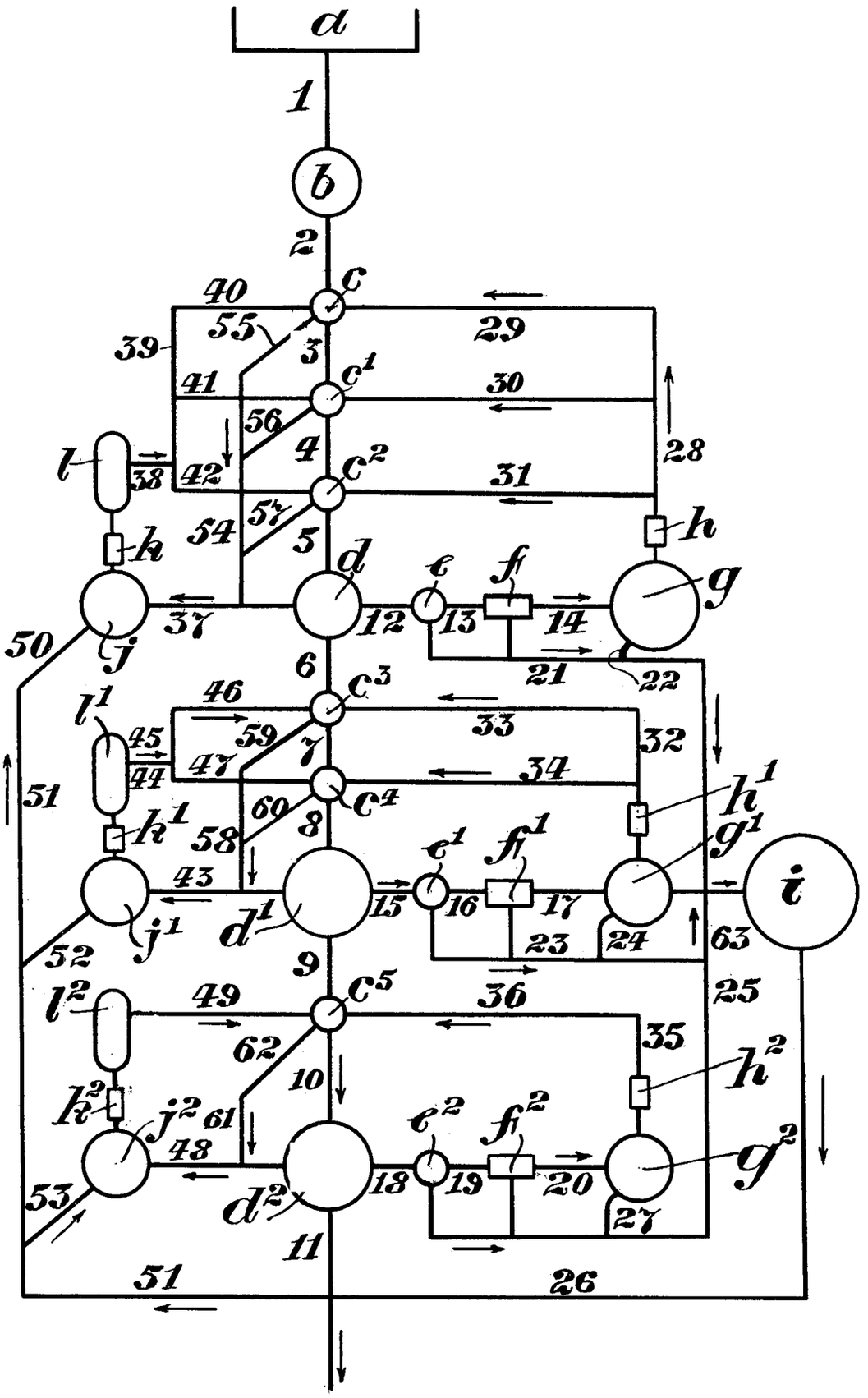
Dated this 20th day of December 191/.

Hugh A. Lisle.
.....

Case A or A'

13

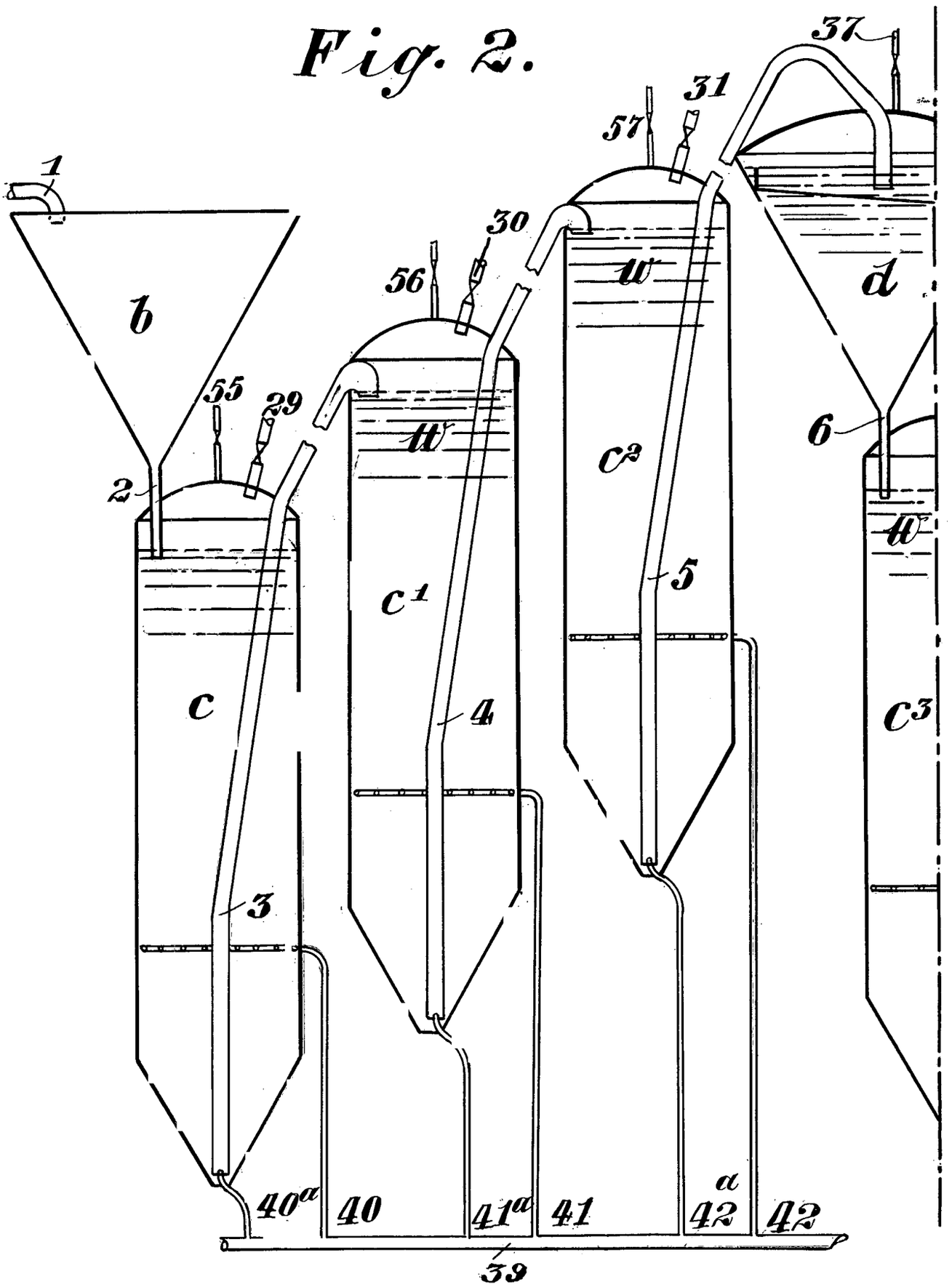
Fig. 1.



Base A or A'

(14)

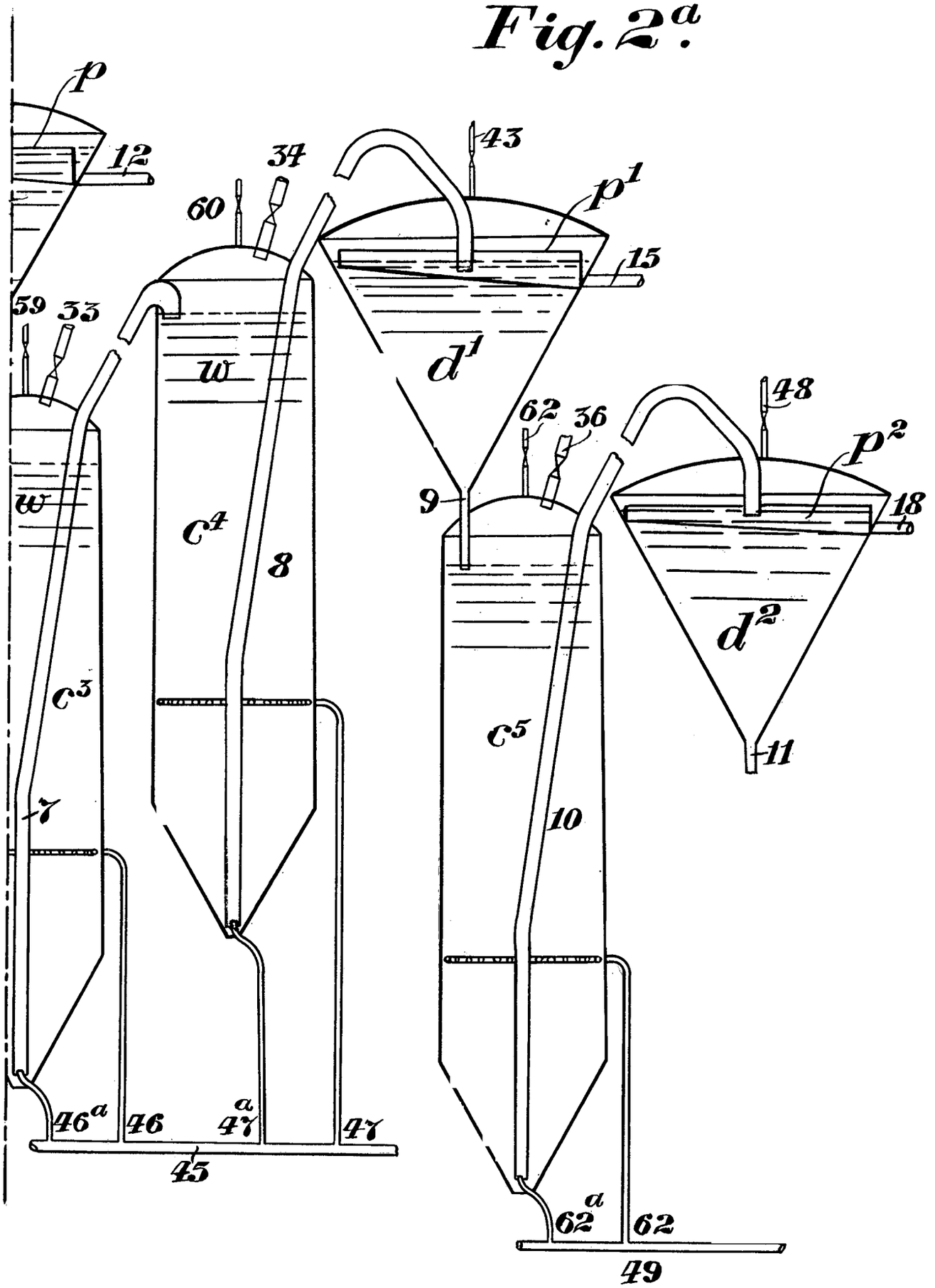
Fig. 2.



Case A or A'

(15)

Fig. 2a.



base A or A¹

16

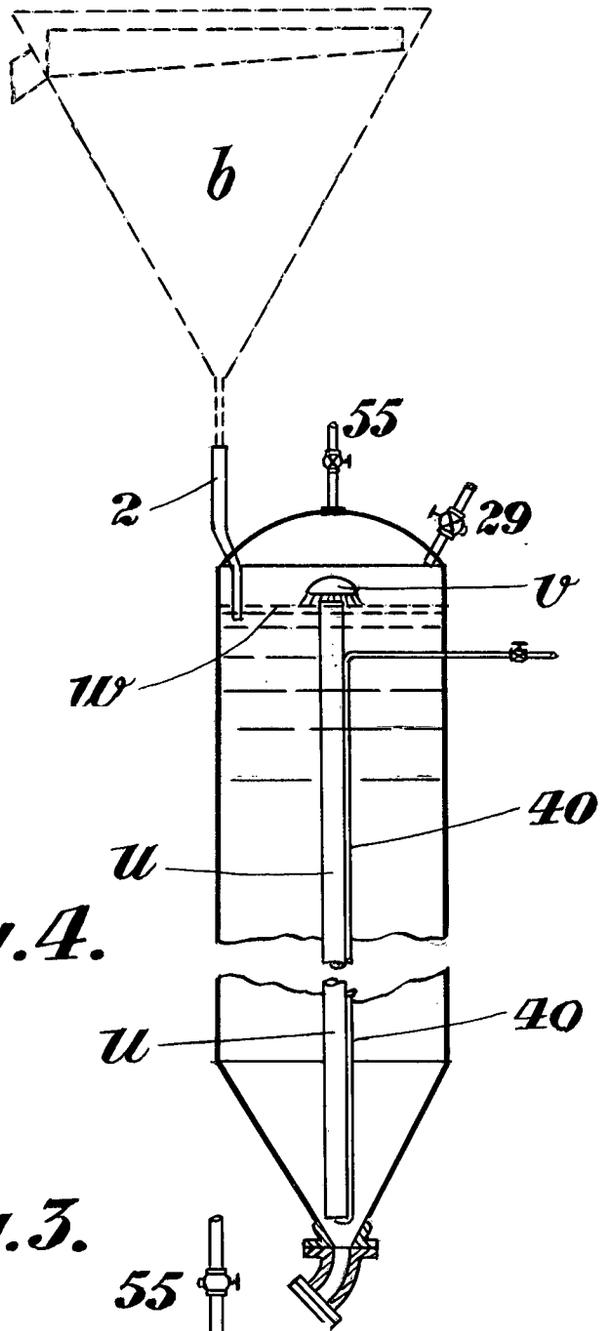
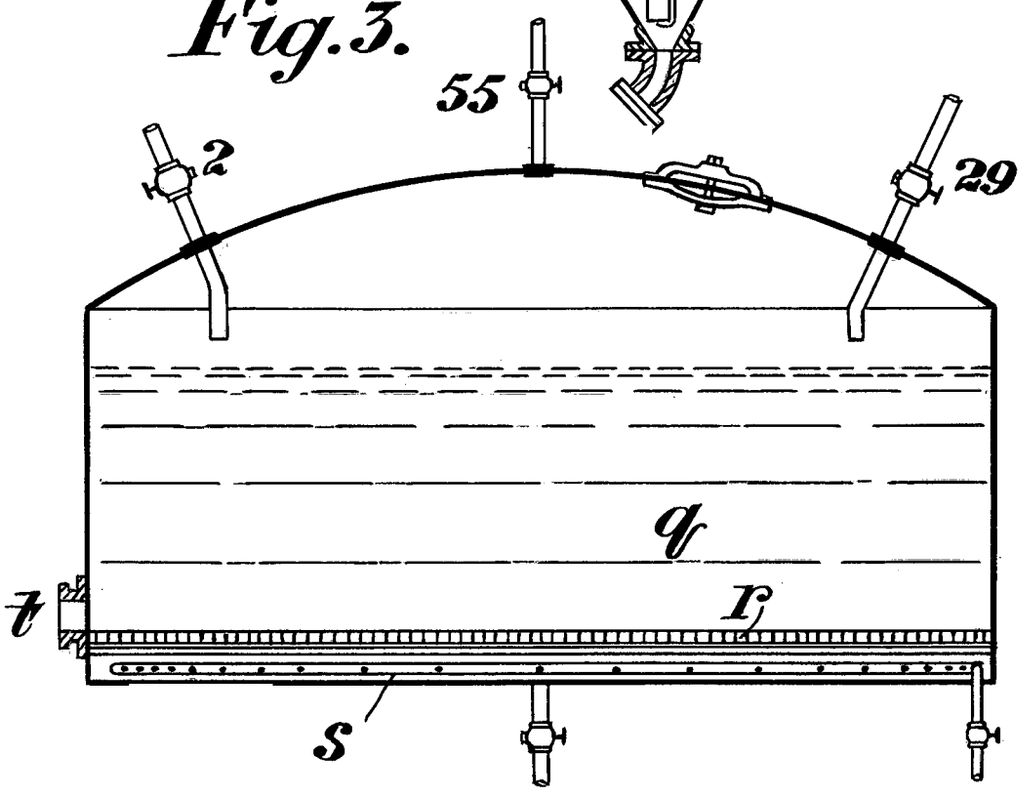


Fig. 4.

Fig. 3.



Enclosure to fm 21071
sl (1)

(17)

Case "A".

MYSORE.

POWER OF ATTORNEY.

IN THE MATTER of the Inventions and Desigrs Regulation, 1894, of the Government of Mysore and in the matter of Hugh Mackenzie Leslie, Metallurgical Engineer, of 53 Waterloo Street, Glasgow, Scotland, an Inventor.

I, the abovenamed Hugh Mackenzie Leslie, do hereby retain, constitute and appoint Henry Hamilton Remfry and Rupert Remfry, Solicitors and Patent Agents, and Hamiltor Greeves Remfry, Patent Agent, all of Calcutta, British India, jointly and severally, as my Agents and Attorreys to apply for and obtain from the Government of Mysore and keep in force ar Exclusive Privilege or Letters Patent for "Improvements in the treatment of ores by the Cyanide Process" and I authorise them to sign my name to such papers and writings and do such acts regarding the same, including the appointment of a substitute or substitutes, as may be necessary or expedient.

Dated this 20th day of December 1911.

Signed, Sealed and Delivered at Glasgow, Scotland, in the presence of:-

Hugh A. Leslie.

Margaret Findlay Young
94 Hope Street Glasgow Scotland Typist.

James Thomson
94 Hope Street Glasgow Scotland Engineer

SOLICITORS & PATENT AGENTS REMFRY & SON. CALCUTTA.

(18)

Gen Files 210 + 211
06/9/11-12

COUPON. The remitter may write here any communication to the payee.

Rs. 122 Mysore H.M.Leslie 2 Mysore
Applications. Cases A & B.

Rec'd Mysore 24.1.12
KEMPEY & SON
19/1/12
Remitter.

Z B V

25-1-12

Gen

4 4 Dfs (19)

G.R.S. 26] 3044/1912

File No. 210-11

Serial No. 2

Diary No. of letter replied to 3049

No. G 40664.

General and Revenue Secretariat

( )

, *the* 19 .

To

Messrs Remfry & Son,

Solicitors Patent Agents, Calcutta

Date of issue 8 · 2 · 12

Signed by Mr Ramaswamayya

Gentlemen,

With refce to your letter of the 19th Jany 1912, forwarding an applon for leave to file a specificaton of an invention for "Improvements in the treatment of ores by the Cyanide Process" by Mr. Hugh Mackenzie Leslie of Glasgo I am directed to request that an authenticated copy of the order passed on the corresponding applon made in the United Kingdom may be obtained stated thereon

over.

SUBJECT.

copied RAV 2-12

and forwarded to this Office for report

I have &c,

29.1.12

For the Secretary

VS. 41

List of enclosures,

Copied by

Examined by

GPB—20,000—26-9-10

money & cover when ready
9-2 pm

G.R.S. 29A1 4 Offs

(4)

190

From

The Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept

To
The Superintendent
of Stamps

Dated

Despatched 8th February 1912

Received

General No. G 4065-
No. G.M. 210-11-3

ENCLOSURE No. Rupee one.

Has the honor to forward herewith a Power-of-Attorney executed by Mr. Hugh Mackenzie Leslie of Glasgow constituting Messrs H.H. & H. Remfry & N.G. Remfry of Calcutta as Agents in respect of his invention for "Improvements in the treatment of ores by the Cyanide Process" and to request that the same may be impressed with the Mysore Govt. Stamp of the value of Re one and returned to this office

2. The sum of Re one is herewith forwarded.

By Order

29.1.12
For Asst Secretary

GPB—10,000—3-1-06.

G.R.S. 29A] 4 365

22

190

3024/3025

From

The Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept

To
The State Geologist
in Mysore

Dated

Despatched 8. 2. 12

Received

General No. G 4066
No. G. Re 210 11-4.

ENCLOSURE No. 1.

Has the honor to forward
herewith for report under
Sec 6 cl (2) of the Mysore Inventions
and Designs Regn. XI of 1894 an
application for leave to file a
specification of an invention for
"Improvements in the treatment
of ores by the Cyanide Process"
by Messrs Hugh Mackenzie & Robt
Gilchrist

2 The applns may be returned
along with the report called for.

By Order

29.1.12
for Secretary

US. 41

GPB—10.000—9-4-06.

Treasury & Currency
Ml
9-2-12

G.R.S. 29. 4 Dbls

23

190

From

The Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To
The Deputy Commissioner
Treasury Dept
Bangalore D C

Dated

Despatched 8-2-12

Received

General No. G 40 67
No. G-Re 210 11-5

ENCLOSURE No. Rs 10/-

Has the honor to forward herewith a sum of Rs 10/- ben the fee ~~for~~ received from Messrs Rempry & Son, Calcutta, unde cl(1) of Schedule IV of the Mysor Inventions and Designs Regulat XI of 1894, in respect of an appl for leave to file a specification of an invention ~~for~~ "Improvements in the treatmen ofores by the Cyanide Proces" by Mr. Hugh Mackenzie Leslie o Glasgow, and to request the favor of an acknowledgmen the receipt of the amount.

By Order

29/1/12
For Secretary

15.41

G.P.B.—10,000—2-4-06.

(24)

V-12 GA

MYSORE STAMP SUPERINTENDENTS OFFICE. 9 FEB. 1912 BANGALORE. 191

From

The Superintendent of Stamps
in Mysore.

DIARY No. 3392 G

1911-1912
SECTION Gen. Mis
FILE No. 210 0694-12
SERIAL No. 6

To The Secretary to the
Government of Mysore
General & Rev. Departments
Bangalore

Dated 9th

Despatched

Received February 1912

General No. 107
No.

Enclosure No. one Stamped
Power of Attorney

His ~~Letter~~ Docket No. G 4065
~~Gen 210-12-3~~

Dated. ~~8-2-12~~

Has the honor to return herewith duly stamped the Power of Attorney received with the above, and to request the favor of an acknowledgment.

Superintendent of Stamps
in Mysore.

GPB —500—27-7-1

(25)

fm 210-11-7

V 1912 GA

Rs 10-0 Book No. 1014 A39 135

Bangalore Treasury dated 13-2-12

Received from Secy to the Govt of Bombay Genl & Rev Dept

Rupees Ten only

Annas — and Pies — being on account of

fee in respect of inventions from Mr. Hugh Mackenzie Leslie of Glasgow under Act 6 of 1911

DIARY No. 3500

Rs 4067 dt 13-2-1912 M Ramaswamy

Genl Rules Section fee: mis In charge of Treasury.
Bangalore

210 of 1911-12

7

M.G.D. 13]

(26)

MYSORE GEOLOGICAL DEPARTMENT,

Dated Bangalore, 30. March *1912.*

No. 1832

Encls. five.

DIARY No. 4173 G.

1911-1912
SECTION Gen: mis
No. 210 of 1911-12
SERIAL No. 8

From

DR. W. F. SMEETH, M.A., D.Sc., &c.,

State Geologist in Mysore.

To

C.S. Balasundaram Iyer, Esquire, B.A.,

Offg. Secretary to the Government of His Highness

the Maharaja of Mysore, Gen. & Rev. Depts.

SIR,

In reply to the marginally noted communications from your Office, I have the honour to forward herewith copy of letter No.653, dated 26th March 1912, from Mr.R. Bocquet, Inspector of Mines, on the subject of the applications for leave to file the specifications of certain inventions

No.G.4066/G.M.210-11-4, dated 8.2.12.
No.G.4350/G.M.219-11-2, dated 21.2.12.
No.G.4357/G.M.211-11-3, dated 21.2.12.
No.G.4506/G.M.220-11-2, dated 27.2.12.

2. The specifications received with your dockets referred to are herewith returned.

I have the honour to be,

Sir,

Your most obedient servant,

K. Subbaraman
Registrar
for State Geologist in Mysore.
[Absent - In Camp]

C.N.

GBP--250--14-5-10

Enclosure to Jun 21-2-11
8(8)

(27)

Letter No.653, dated 26th March 1912, from R. Bocquet, Esquire, Inspector of Mines in Mysore, to Dr.W.F. Smeeth, M.A.,D.Sc.,&c., Secretary to the Government of His Highness the Maharaja of Mysore, Geological Department.

I have the honour to return herewith the following specifications of inventions:-

1. "Improvements in the treatment of ores by the Cyanide Process" by Mr.H.M. Leslie

2. "Improvements in the extraction of metals from their ores" by Mr.H.M.Leslie

3. "Process for the precipitation of precious metals from Cyanide solution" by Mr.I.M.Niel.

4. "Improvements in connection with furnaces for the direct production of iron and steel from iron ores" by Messrs.W.S. Simpson and H.Oviatt.

As far as I am aware there is nothing to prevent the applications for leave to file the above specifications from being granted.

Copy,

R. Bocquet

State Geologist in Mysore.

30-3-1912.

DIARY No. 6440

GENERAL. I 16/5 pm WP

1912-1913

SECTION Gen : Mis

FILE No. 210 of 1911-12

28

REGISTERED.

To

THE ~~PATENT~~ SECRETARY, TO THE GOVERNMENT OF MYSORE,
~~PATENT OFFICE~~, GENL. & REV. DEPTS.,
~~CALCUTTA~~. BANGALORE,
MYSORE.

FROM

REMFRY & SON,
SOLICITORS AND PATENT AGENTS,
CALCUTTA.

Dated CALCUTTA, the 13th May 1913.

Sir,

Dept. P. File Lr. M.
FILE INDICATION.
Mysore Pats.

re H.M.LESLIE. (MYSORE) CASE A.

In the matter of this Application we beg to submit herewith, as requested, a Certified Copy of the British Printed Specification No. 27,879/11 and solicit the favour of the early issue of the Order granting leave to file Specifications herein.

We have the honour to be,

Sir,

Your very obedient servants,

REMFRY & SON

1 Enclo

A.M.

1,000.—17-3-11.

I Certify this, including the Drawing forming part thereof, to be a true Copy.

17 APR 1913

Acting for Comptroller.

N° 27,879 A.D. 1911

Date of Application, 12th Dec., 1911—Accepted, 22nd Aug., 1912

COMPLETE SPECIFICATION.

Improvements in the Treatment of Ores by the Cyanide Process.

I, HUGH MACKENZIE LESLIE, of 53, Waterloo Street, Glasgow, Metallurgical Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

In the extraction and recovery of metals from their ores by means of cyanide it is generally known that a loss of the cyanide takes place, apart from the loss which occurs in the vessels in which the ore pulp is treated, through decomposition, by various agencies, of the cyanide or cyanogen compound used, and, as a result of the decomposition, gases and vapours (mainly, hydrocyanic acid gas) containing the cyanogen radical are given off from all the vats, precipitation tanks or extractor boxes, filters, *etc.*, used and are lost in the atmosphere.

Likewise, in treating ores by the cyanide process by any of the known methods, such as agitation, percolation, or decantation, whenever the pulp, mixed with, or in contact with, a cyanogen compound, is exposed to, or is in contact with, the atmosphere a similar loss of cyanide occurs apart from the amount of this chemical actually consumed in the extraction and recovery of the metal.

The word extraction hereinafter used I apply not only to the dissolving of the metal from its ore but also to the subsequent recovery of the said metal in a marketable form from said solution.

The object of my invention is to effect great economy in the treatment of ores by sodium or potassium cyanide or other cyanogen compounds by using an improved construction and arrangement of plant in which all the cyanogen containing gases liberated during the treatment are collected and utilized over and over again in the process of extraction of the metal thereby obtaining the maximum effect at the minimum of cost.

In carrying out this invention I cover the tanks, vats, extractor boxes, machines or places where cyanogen compounds (hydrogen cyanide, potassium or sodium cyanide or other cyanide) in gas or solution are found, contained, or are used, in, or for, the process of extraction, in such manner as to prevent the said gases escaping or diffusing into the atmosphere. The gases from these covered vessels and (or) places are carried off and conducted to one or more collecting vessels (such as a gasometer or the like) and then to a compressor or pump or the like, the gases being withdrawn, as desired, from the collecting vessel (or vessels) and after being compressed by the compressor being delivered therefrom and again utilized, in conjunction with air, for agitating or aerating the ore pulp under treatment, and for lifting the same from vessel to vessel the cyanogen containing gases being thereby again brought into contact with the material on which they act. As will be seen, by this closed system the cyanogen containing gases given off during all the stages of the process of extraction are collected and then brought back and forced, under pressure, into the agitators or other vessels in which the ore pulp is being treated. This forcing of the gases, back again into the ore pulp vessels goes on, or may go on, continuously, so long as the treatment is being carried out. Of course, if so desired, the cyanogen containing gases may be collected and thereafter used as and when required.

[*Price* 8*d.*]

If so desired, instead of conducting the waste gases first to a collecting vessel they may be conducted directly to the compressor.

Should it be necessary to introduce a base to accelerate the process of dissolution of the metal or for the formation of a soluble cyanide or to assist the precipitation of the metal from solution in the precipitation tanks or extractor boxes, such agent can be introduced into the agitator or other vessel in which the ore pulp is undergoing treatment as may be found necessary or be added to the solution prior to its passing into the said precipitation tanks or extractors or at any other stage of the process.

In some cases instead of forcing the cyanogen containing gases into the agitators or other vessels containing the ore pulp the gases may be sucked into and through the pulp by means of a suction pump or other suitable suction appliance.

Theoretically about 4.5 lbs. of cyanide should dissolve about 100 ozs. of gold but, in actual practice, it is found that nearly forty times this quantity is required.

Owing to the great loss which takes place it is usual, at present, to increase the strength of the working solutions, from time to time, by the addition thereto of fresh cyanide. Now, under my system, the gases evolved during the whole process are collected and again passed into contact with the material and if an alkaline solution is added thereto from time to time then the hydrocyanic acid in such gases will combine with the alkali and give the same effect as if fresh cyanide were added, thereby, to a great extent, obviating the necessity for such additions of cyanide. Further hydrocyanic acid can be safely used for treating gold telluride and other ores, and ammonium cyanide for treating, say, silver ores with very effective and economical results.

A feature of the system is that the agitators and dewatering cones of each group of the same are so arranged that the pulp is gradually raised step-by-step by means of an air lift the gases collected being introduced to the agitators with the air at each lift and thereby effectively acting on the pulp.

In order that the invention may be clearly understood I have, by way of illustration or example, shown at Figs. 1 and 2 of the drawings annexed, a suitable construction and arrangement of plant for carrying out the complete cyanide process according to my closed system.

Fig. 1 is a diagram giving a plan view of the plant and Fig. 2 is an elevation of the series of agitators.

Under my invention the pulp from the mill *a* passes by means of a conduit 1 to a dewatering cone *b* where the surplus water is removed and the pulp thickened for treatment. The pulp passes onwards by pipe 2 to an agitator *c* and, in turn, from this agitator *c* to a second agitator c^1, a third agitator c^2 and a second dewatering cone *d* from whence by pipe 6 it is delivered to a fourth agitator c^3 then to a fifth agitator c^4 and to a third dewatering cone d^1 and from this, again, it may be delivered by pipe 9 to a sixth agitator c^5 and a final dewatering cone d^2. The pulp is lifted step by step from agitator to agitator (or dewatering cone) by means of lift pipes 3, 4, 5, 7, 8, 10, and compressed air (in conjunction with cyanogen containing gases evolved during the process) is used for giving each lift, the compressed air being supplied from compressed air mains 39, 45, and 49 to pipes 40^a, 41^a, 42^a, 46^a, 47^a and 62^a, these latter pipes projecting into the lower ends of the lift pipes 3, 4, 5, 7, 8, 10, and forcing the pulp up through these pipes. As will be seen at Fig. 2, the agitators are arranged in step formation and the pulp is gradually raised from the agitator *c* to the cone *d*, from the agitator c^3 to the cone d^1 and from the agitator c^5 to the cone d^2. The pulp is agitated and aerated within each agitator by means of perforated air pipes therein which communicate with air supply pipes 40, 41, 42, 46, 47 and 62. The pulp in the agitators *c*, c^1, c^2, is acted on by strong solutions of cyanide supplied through solution pipes 29, 30, and 31 which latter communicate, by the pipe 28, with the solution pump *h*

and sump g. The pulp, after circulating through the agitators c, c^1, c^2, is delivered to the dewatering cone d where the surplus solution flows over the baffle p and runs off by the pipe 12 to the filter tank e and thence by pipe 13 to the extractor f (where the dissolved metal is removed) and thence, by means of the pipe 14, to the sump g ready for use over again. The thickened pulp from the cone d passes, by the pipe 6, to the agitator c^3, and by lift pipe 7 to agitator c^4, these agitators being each supplied with a weak solution of cyanide through pipes 33 and 34 which latter are connected, by a pipe 32, to a solution pump h^1 and a sump g^1. From the agitator c^4 the pulp passes to the dewatering cone d^1 the surplus weak solution flowing over the baffle p^1 and passing away by the pipe 15 to a filter e^1 and then, by a pipe 16, to an extractor box f^1 (where any metal is removed) and then, by the pipe 17, to the sump g^1 ready for reuse in the same manner as the strong solution. The thickened pulp from the cone d^1 passes, by pipe 9, to the agitator c^5 where it is agitated in conjunction with water or very weak solution supplied through the pipe 36 communicating with the pipe 35 pump h^2 and sump g^2. The pulp from the agitator c^5 passes to the dewatering cone d^2 the surplus water flowing over the baffle p^2 and passing by the pipe 18 to a filter e^2 and by pipe 19 to the extractor box f^2 (where any metal still left is extracted) the solution thereafter passing, by the pipe 20, to the sump g^2. The thickened pulp and sand in the cone d^2 may be discharged by the pipe 11 on to the dump or it may be further dewatered by filter pressing, or otherwise, if it is thought desirable to do so.

Instead of the dewatering cones d, d^1, d^2, any other well known and suitable dewatering apparatus may be used and these dewaterers may be introduced after any of the agitators as is found most suitable for the ore under treatment. The number of agitators and dewaterers would be arranged to suit the requirements of the ore under treatment.

All the various agitators, dewatering cones, filters, extractor boxes, and sumps are covered over and the air charged with hydro-cyanic acid from these various places passes to gasometers i, j, j^1, j^2. The first series of agitators have gas connections 55, 56, 57, 54, leading to a gas main 37 communicating with the gasometer j. The second series of agitators have likewise pipes 59, 60, and 58 leading to a gas main 43 communicating with the gasometer j^1. The sixth agitator c^5 has gas pipes 63^a, 61, communicating with a gas main 48 leading to the gasometer j^2. The dewatering cones d, d^1, d^2, have also gas pipes connecting with the mains 37, 43 and 48, as shown, so that the cyanogen containing gases evolved during the process are carried away by these various pipes to the gasometers j, j^1, j^2. Further, the filters c, e^1, e^2, the extractor boxes f, f^1, and f^2, and the sumps g, g^1, g^2, are also covered over and provided with gas pipes for carrying away the gases evolved to a main gasometer i by means of the various pipes 21, 22, 23, 24, 25, 26, 27 and 63. This main gasometer i is connected by the pipe 51 and branches 50, 52, 53, with the gasometers j, j^1, j^2.

The air and gas in the gasometers can be drawn off, as required, by means of the compressors k, k^1, k^2, and forced into the receivers l, l^1, l^2, and thence by means of the pipe connections 38, 44, and 49 to the air mains 39, 45, and the various agitators the gas passing into the agitators in conjunction with the air for the air lift and also through the perforated agitator pipes 40, 41, 42, 46, 47, and 62, thereby effectively acting upon the pulp in the agitators. In this manner the cyanogen containing gases evolved during the process are used over and over again so long as the treatment lasts. At the initial start of the process the gasometers will be supplied with air alone but as the process continues the air becomes gradually more and more charged with hydrocyanic acid and, as the strength of this acid increases, then the strength of the cyanide solutions introduced into the agitators can be lessened. The cyanide for strengthening the solutions may, as usual, be added at the sumps. Atmospheric

air for use in the process may be admitted to the compressors k, k^1, k^2, as required, a valve arrangement being provided for this purpose.

w wherever repeated indicates the pulp level.

It will be seen from the foregoing that the whole system is a constantly circulating one and that neither the air used nor the gases evolved during the process are allowed to escape into the atmosphere.

The plant is so arranged, as will be seen, that any one of the series of agitators may be cut out and for this purpose the pipes are supplied with suitable cocks.

Although I have shown gasometers, compressors, and receivers for each set of agitators these may be differently arranged and one or more of the same be dispensed with or added as desired.

I am aware that, in connection with the cyanide process for the extraction of metals from slimes or the like, it has been heretofore proposed to provide a series of agitating vats having air tight covers and through which a gas is caused to circulate, such gas being supplied to each vat at the foot thereof and being discharged therefrom at the top, such gas (when so discharged containing a certain amount of hydrocyanic acid gas) being conducted to a receiver and thereafter forced by a pump or compressor back again into the vats.

It has also been proposed to provide a cyanide extraction apparatus having a rotating cylindrical agitator, whose opposite ends are connected by means of pipes, with a fan by the action of which vapours or gaseous fluids are caused to circulate through the cylinder and pipes continuously, so that the materials under treatment are exposed to the action of the vapours or gases.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:-

In the treatment of ores by the cyanide process covering all the vessels or places where the cyanogen compounds in gas or solution are found, contained, or are used, in or for the process of extraction, and carrying off the gases from these covered vessels or places and conducting them to one or more collecting vessels and then to a compressor or pump or equivalent (or direct to the compressor or pump or equivalent) whereby the gases are compressed said gases being then used in conjunction with air for agitating or aerating the ore pulp and for lifting the same from vessel to vessel the cyanogen containing gases being thereby brought into contact with the material, on which they act, all substantially as hereinbefore described with reference to the drawings annexed.

Dated this 11th. day of December, 1911.

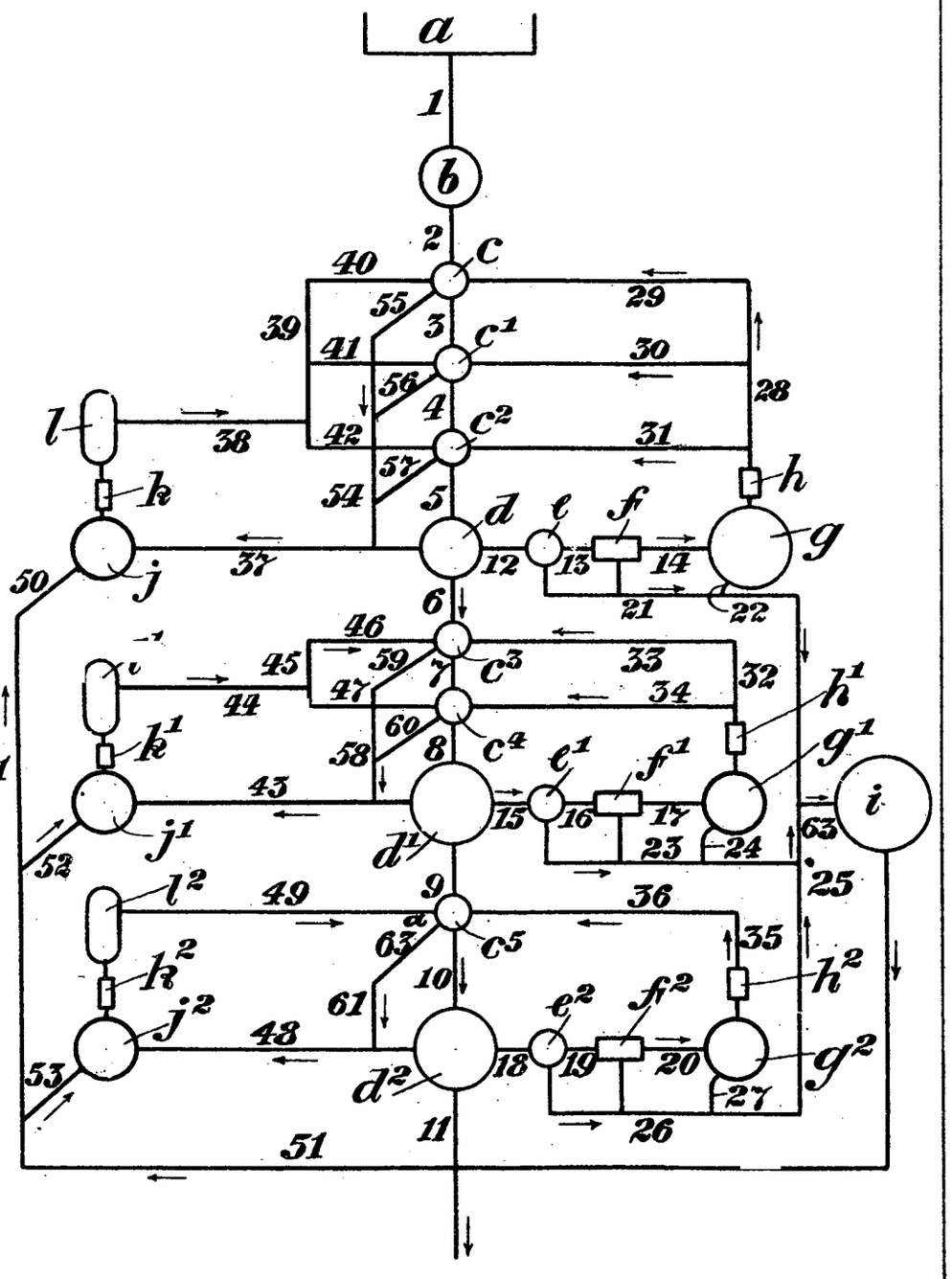
H. D. FITZPATRICK & Co.,
Chartered Patent Agents,
94, Hope Street, Glasgow.

Excd
J.M.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1912.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.



Malby & Sons, Photo-Litho.

[This Drawing is a reproduction of the Original on a reduced scale.]

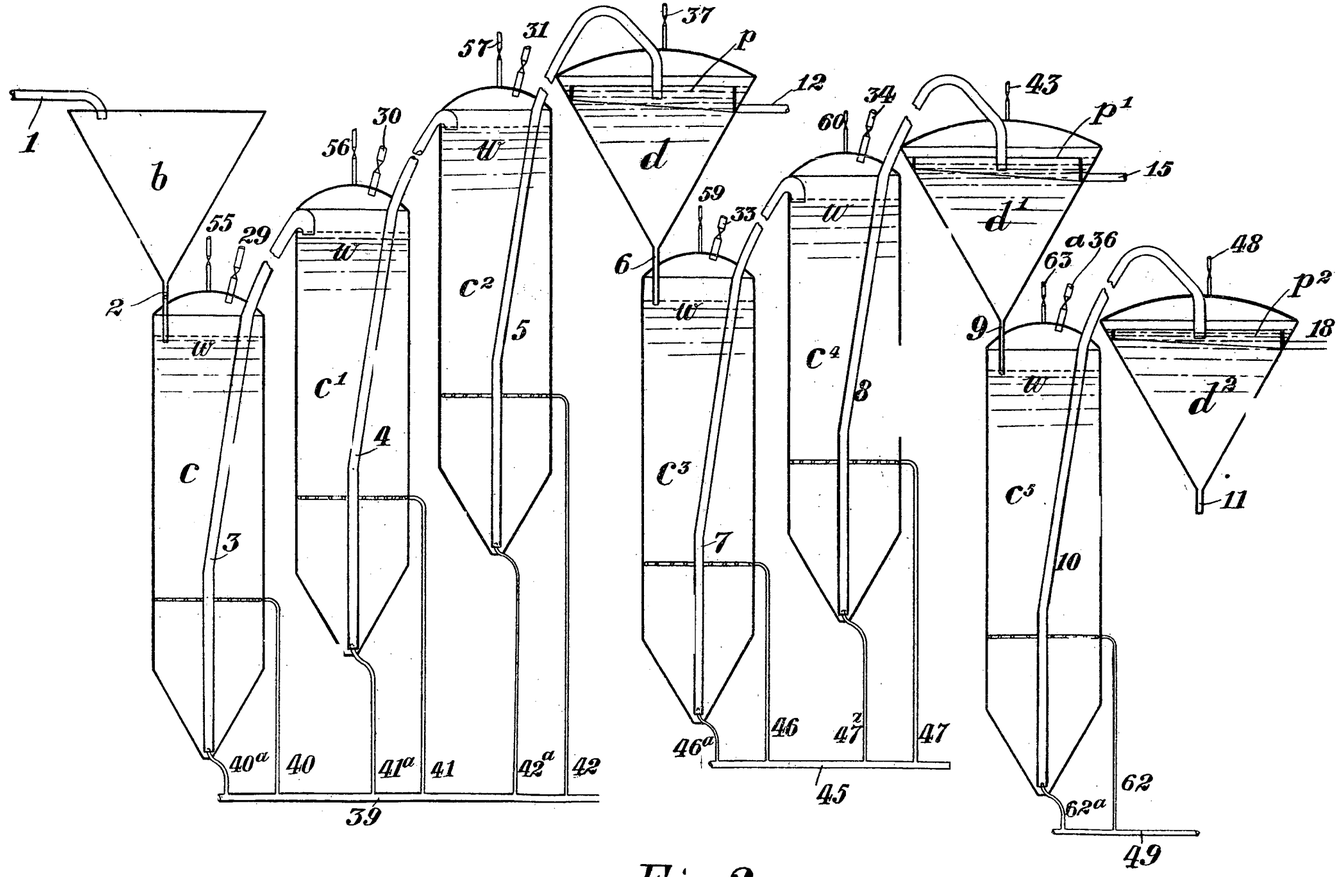


Fig.2.

Malby & Sons, Photo-Litho.

№ G. 7877/G.M-210-11-10

GOVERNMENT OF MYSORE

General Department.

Register No. 4 **of 190**1-12.

Bangalore, the 6th June 190 .

WHEREAS an application, dated the 20th December 1911 and received on the 22nd January 1912, has been submitted under Section 5 of the Mysore Inventions and Designs Regulation, 1894, by Mr Hugh Mackenzie Leslie, Metallurgical Engineer, of 53, Waterloo Street, Glasgow, Scotland,

(hereinafter referred to as "the applicant") for leave to file a specification of an invention for "Improvements in the treatment of ores by the Cyanide Process"

And whereas the applicant has duly complied with all the requirements of Section 5 of the said Regulation;

The Government of Mysore are pleased, under Section 6 of the said Regulation, to authorize the applicant to file a specification of the said invention in accordance with the provisions of the said Regulation.

ORDERED, that the applicant be, and he is hereby, informed accordingly.

By Order of the Government of Mysore,

Dft) S.M. Rajagopal

for Secretary to the Govt. of Mysore,
Gen. and Rev. Depts.

Certified that the fees prescribed in the fourth schedule to the Mysore Inventions and Designs Regulation, 1894, in respect of the application for leave to file the said specification and of the filing thereof have been paid by the applicant, and that the specification hereinbefore described has been duly filed in accordance with the provisions of Section 8 of the said Regulation on this the Twenty seventh day of June 1912.

Dft) S.M. Rajagopal

for Secretary to the Govt. of Mysore,
Gen. and Rev. Depts.

30

(Section 8 of the Inventions and Designs Regulation, 1894.)

8. (1) If within six months from the date of an order under Section 6, Sub-Section (1), or within such further time, not exceeding three months, as the Government of Mysore, in its discretion, may, on cause shown to its satisfaction and on payment of the fee prescribed in that behalf in the fourth schedule, see fit to allow, the applicant causes a specification of his invention to be filed in manner by this Part required, and the fee prescribed in the fourth schedule in respect of the filing of the specification to be paid, the applicant shall, subject to the other provisions of this Part, be entitled to the exclusive privilege of making, selling and using the invention in the Territories of Mysore, and of authorizing others so to do, for a term of fourteen years from the date of the filing of the specification.

(2) But an exclusive privilege in respect of an invention of a new manufacture shall, notwithstanding anything in Sub-Section (1), cease, if the inventor fails to pay, within the time limited in that behalf by the fourth schedule, any fee prescribed in that schedule in respect of the continuance of the privilege.

(3) If, nevertheless, in any case, by accident, mistake, or inadvertence, an inventor fails to pay any such fee within the time so limited, he may apply to the Government of Mysore for an enlargement of the time for making the payment.

(4) Thereupon the Government of Mysore may enlarge the time accordingly, on payment of the fee prescribed in that behalf in the fourth schedule, and subject to the following conditions, namely :—

(*a*) the time for making a payment shall not in any case be enlarged for more than three months ; and

(*b*) if any suit is instituted in respect of an infringement of the exclusive privilege committed after a failure to make a payment within the time limited for the making thereof and before the enlargement of that time, the Court disposing of the suit may, if it thinks fit, refuse to award or give any damages in respect of the infringement.

GPB—500—7-4-09.

2015 9/6 (3)

G. R. S. 26]

Gen File No. 210-11

Serial No. 11

*Diary No. of letter replied to*_____

No. G. 7878 (E.1)

General and Revenue Secretariat

( )

, the *191* .

Date of issue 6th June 13

Signed by Mr S. P. Rajagopal

To

Messrs Rempry & Son,

Solicitors and Patent Agents,

Calcutta

Gentlemen,

With reference to the correspondence ending with your letter of the 13th May 1913, I am directed to forward herewith Govt Order No. G 7877 Gen. 210-11- dt 6th June 1913, authorizing Mr Hugh Mackenzie Leslie, Metallurgical Engineer, of 53, Waterloo Street, Glasgow, to file a specification of his invention for "Improvements in

over.

SUBJECT.

4/6

the treatment of ores by the Cyanide Process" and to request that the same may be communicated to the party concerned.

I have &c,

For Secretary.

List of enclosures.

Copied by

Examined by

GPB—25,000—8-8-11.

DIARY No. 7129

1912-1913

SECTION Gen: Mis

FILE No. 210 of 1911-12

GENERAL.

REGISTERED.

To

THE ~~PATENT~~ SECRETARY, TO THE GOVERNMENT OF MYSORE,
~~PATENT OFFICE~~, GENL. & REV. DEPTS.,
~~CALCUTTA~~. BANGALORE,
MYSORE.

FROM

REMFRY & SON,
SOLICITORS AND PATENT AGENTS,
CALCUTTA.

Dated CALCUTTA, the 17th June 1913.

Sir,

Dept. P. File Lr. M.
FILE INDICATION.
Mysore Pats.

re H. M. LESLIE. (CASE A) MYSORE
No. 4 of 1911-12.

Pursuant to the Order granting leave in this matter dated 6th June 1913, Register No. 4 of 1911-12, we have the honour to forward herewith 4 copies of the Specification of HUGH MACKENZIE LESLIE, Metallurgical Engineer, of 53 Waterloo Street, Glasgow, Scotland, in respect of his Invention for "IMPROVEMENTS IN THE TREATMENT OF ORES BY THE CYANIDE PROCESS".

The abovementioned Order is enclosed and we solicit the favour of your filling to the Certificate at foot thereof and having same signed.

A Post Office Order for Rs. 30/- is sent to-day.

We have the honour to name our Office in Calcutta as the Address for Service under the Act.

We have the honour to be,
Sir,
Your very obedient servants,

REMFRY & SON

I.M.B.

1,000.—17-3-11.

MYSORE.

SPECIFICATION.

TO ALL WHOM IT MAY CONCERN: Be it known that I, Hugh Mackenzie Leslie, Metallurgical Engineer, of 53 Waterlo Street, Glasgow, Scotland, am in possession of an Invention for "Improvements in the treatment of ores by the Cyanide Process" and I, the said Hugh Mackenzie Leslie, do hereby declare the nature of the said invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement thereof, that is to say:-

In the extraction and recovery of metals from their ores by means of Cyanide it is generally known that a loss of the same takes place, apart from the loss which occurs in the vessels in which the ore pulp is treated, through decomposition, by various agencies, of the Cyanide or Cyanogen compound used, and, as a result of the decomposition, gases and vapours (mainly, Hydrocyanic Acid Gas) containing the Cyanogen Radical are given off from all the vats, precipitation tanks or extractor boxes, filters, etc. used and are lost in the atmosphere.

Likewise, in treating ores by the Cyanide process by any of the known methods, such as agitation, percolation, or decantation, whenever the pulp, mixed with, or in contact with, a cyanogen compound, is exposed to, or is in contact with, the atmosphere a similar loss of Cyanide occurs apart from the amount of this chemical actually consumed in the extraction and recovery of the metal.

The word extraction hereinafter used I apply not only to the dissolving of the metal from its ore but also to the subsequent recovery of the said metal in a marketable form from said solution.

The object of my invention is to effect great economy in the treatment of ores by Sodium or Potassium Cyanide or other Cyanogen compounds by collecting all the Cyanogen containing gases liberated during the treatment and which were formerly wasted in the atmosphere and utilising the same over and over again in the process of extraction of the metal thereby obtaining the maximum effect at the minimum of cost.

In carrying out this invention I cover all, or as many as may be desired, of the tanks, vats, extractor boxes,

machines or places where Cyanogen compounds (Hydrogen Cyanide, Potassium or Sodium Cyanide or other Cyanide) in gas or solution are found, contained, or are used, in, or for, the process of extraction, in such manner as to prevent the said gases escaping or diffusing into the atmosphere. The gases from these covered vessels and (or) places are carried off and conducted preferably to one or more collecting vessels (such as a gasometer or the like) and then to a compressor or pump or the like, the gases being withdrawn, as desired, from the collecting vessel (or vessels) and after being compressed by the compressor being delivered therefrom and again utilized, either alone or in conjunction with air, for agitating or aerating the ore pulp under treatment, the Cyanogen containing gases being thereby again brought into contact with the material on which they act. As will be seen, by this system which I may term a "closed system" the Cyanogen containing gases given off during the stages of the process of extraction are collected and then brought back and forced, under pressure, into the agitators or other vessels in which the ore pulp is being treated. This forcing of what would be otherwise waste gases, back again into the ore pulp vessels goes on, or may go on, continuously, so long as the treatment is being carried out. Of course, if so desired, the Cyanogen containing gases may be collected and thereafter used as and when required.

If so desired, instead of conducting the waste gases first to a collecting vessel they may be conducted directly to the compressor

Should it be necessary to introduce a base to accelerate the process of dissolution of the metal or for the formation of a soluble cyanide or to assist the precipitation of the metal from solution in the precipitation

tanks or extractor boxes, such agent can be introduced into the agitator or other vessel in which the ore pulp is undergoing treatment as may be found necessary or be added to the solution prior to its passing into the said precipitation tanks or extractors or at any other stage of the process.

In some cases instead of forcing the Cyanogen containing gases into the agitators or other vessels containing the ore pulp the gases may be sucked into and through the pulp by means of a suction pump or other suitable suction appliance.

Theoretically about 4.5 lbs. of Cyanide should dissolve about 100 ozs. of Gold but, in actual practice, it is found that nearly forty times this quantity is required.

Owing to the great loss which takes place it is usual, at present, to increase the strength of the working solutions, from time to time, by the addition thereto of fresh Cyanide. Now, under my closed system, the gases evolved during the process, and which are at present wasted, are collected and again passed into contact with the material and if an alkaline solution is added thereto from time to time then the Hydrocyanic acid in such gases will combine with the alkali and give the same effect as if fresh Cyanide were added, thereby, to a great extent, obviating the necessity for such additions of Cyanide.

The common use of volatile solvents such as Hydrocyanic acid or Ammonium Cyanide or other of the more volatile Cyanogen compounds in their free state or in a simple water solution is not at present commercially possible as, owing to their great loss by evaporation to the atmosphere in open vessels the consumption of these chemicals is very great. Further, the use of such volatile Cyanogen

solvents cannot be carried on with safety to the operators or to any animal life within the vicinity of the plant as the escaping gases are extremely poisonous. Under my closed system, however, Hydrocyanic acid can be safely used for treating Gold Telluride and other Ores, and Ammonium Cyanide for treating, say, Silver ores with very effective and economical results.

In order that the invention may be clearly understood I have, by way of illustration or example, shown at figs. 1 and 2[-2a] of the drawings annexed, a suitable construction and arrangement of plant for carrying out the complete Cyanide process according to my closed system.

Fig.1 is a diagram giving a plan view of the plant and fig. 2[-2a] is an elevation of the series of agitators.

In carrying out the process according to my system and with plant such as shown at figs. 1 and 2[-2a], the pulp from the mill a passes by means of a conduit 1 to a dewatering cone b where the surplus water is removed and the pulp thickened for treatment. The pulp passes onwards by pipe 2 to an agitator c and, in turn, from this agitator c to a second agitator c^1, a third agitator c^2 and a second dewatering cone d from whence by pipe 6 it is delivered to a fourth agitator c^3 then to a fifth agitator c^4 and to a third dewatering cone d^1 and from this again, it may be delivered by pipe 9 to a sixth agitator c^5 and a final dewatering cone d^2. The pulp is lifted from agitator to agitator by means of lift pipes 3,4,5,7,8,10, and compressed air is used for giving the lift, the compressed air being supplied from compressed air mains 39,45 and 49 to pipes 40^a, 41^a, 42^a, 46^a, 47^a, and 62^a, these latter pipes projecting into the lower ends of the lift pipes 3,4,5,7,8,10. and forcing the pulp up through these pipes. As will be

seen the agitators are arranged in step formation although they may be otherwise arranged if so desired. The pulp is agitated and aerated within each agitator by means of perforated air pipes therein and which communicate with air supply pipes 40,41,42,46,47 and 62. The pulp in the agitators c, c^1, c^2, is acted on by strong solutions of cyanide supplied through solution pipes 29, 30, and 31 which latter communicate, by the pipe 28, with the solution pump h and sump g. The pulp, after circulating through the agitators c, c^1, c^2, is delivered to the dewatering cone d where the surplus solution flows over the baffle p and runs off by the pipe 12 to the filter tank e and thence by pipe 13 to the extractor f (where the dissolved metal is removed) and thence, by means of the pipe 14, to the sump g ready for use over again. The thickened pulp from the cone d passes, by the pipe 6, to the agitators c^3, c^4, which are each supplied with a weak solution of cyanide through pipes 33 and 34 which latter are connected, by a pipe 32, to a solution pump h^1 and a sump g^1. From the agitator c^4 the pulp passes to the dewatering cone d^1, the surplus weak solution flowing over the baffle p^1 and passing away by the pipe 15 to a filter e^1 and then, by a pipe 16, to an extractor box f^1 (where any metal is removed) and then, by the pipe 17, to the sump g^1 ready for reuse in the same manner as the strong solution. The thickened pulp from the cone d^1 passes, by pipe 9, to the agitator c^5 where it is agitated in conjunction with water or very weak solution supplied through the pipe 36 communicating with the pipe 35 pump h^2 and sump g^2. The pulp from the agitator c^5 passes to the dewatering cone d^2 the surplus water flowing over the baffle p^2 and passing by the pipe 18 to a filter e^2 and by pipe 19 to the extractor box f^2 (where any

metal still left is extracted) the solution thereafter passing, by the pipe 20, to the sump g^2. The thickened pulp and sand in the cone d^2 may be discharged by the pipe 11 on to the dump or it may be further dewatered by filter pressing, or otherwise, if it is thought desirable to do so.

Instead of the dewatering cones d, d^1, d^2, any other well known and suitable dewatering apparatus may be used and these dewaterers may be introduced after any of the agitators as is found most suitable for the ore under treatment. The number of agitators and dewaterers would be arranged to suit the requirements of the ore under treatment.

All the various agitators, dewatering cones, filters, extractor boxes, and sumps are covered over and the air charged with hydro-cyanic acid from these various places passes to gasometers i, j, j^1, j^2. The first series of agitators have gas connections 55, 56, 57, 54. leading to a gas main 37 communicating with the gasometer j. The second series of agitators have likewise pipes 59, 60 and 58 leading to a gas main 43 communicating with the gasometer j^1. The sixth agitator c^5 has gas pipes 62, 61, communicating with a gas main 48 leading to the gasometer j^2. The dewatering cones d, d^1, d^2, have also gas pipes connecting with the mains 37, 43, and 48, as shown, so that the cyanogen containing gases evolved during the process are carried away by these various pipes to the gasometers j, j^1, j^2. Further, the filters e, e^1, e^2, the extractor boxes f, f^1 and f^2, and the sumps g, g^1, g^2, are also covered over and provided with gas pipes for carrying away the gases evolved to a main gasometer i by means of the various pipes 21, 22, 23, 24, 25, 26, 27 and 63. This main gasometer i is connected by the pipe 51 and branches 50, 52, 53, with the gasometers j, j^1, j^2,

The air and gas in the gasometers can be drawn off, as required, by means of the compressors k, k^1,k^2, and forced into the receivers 1, 1^1,1^2, and thence by means of the pipe connections 38,44, and 49 to the air mains 39,45 and 49 and the various agitators so as to act upon the fresh pulp therein, the Cyanogen containing gases being thereby used over and over again so long as the treatment lasts. At the initial start of the process the gasometers will be supplied with air alone but as the process continues the air becomes gradually more and more charged wi Hydrocyanic Acid and, as the strength of this acid increases, then the strength of the Cyanide solutions introduced into the agitators can be lessened. The Cyanide for strengthening the solutions may, as usual, be added at the sumps. Atmospheric air for use in the process may be admitted to the compressors k, k^1, k^2, as required a valve arrangement being provided for this purpose.

w wherever repeated indicates pulp level.

It will be seen from the foregoing that the whole system is a constantly circulating one and that neither the air used nor the gases evolved during the process are allowed to escape into the atmosphere.

The plant is so arranged, as will be seen, that any one of the series of agitators may be cut out and for this purpose the pipes are supplied with suitable cocks.

Although I have shown gasometers, compressors, and receivers for each set of agitators these may be differently arranged and one or more of the same be dispensed with or added to as desired.

If the cyanide process is carried out on the percolation system then a series of percolating tanks (such as q fig.3) would be used in lieu of the agitators these percolating tanks being of ordinary construction

with double bottoms and a perforated compressed air and gas pipe s arranged below the filter floor r. The pipe s of each perlocator would be connected to its proper main, such as 39,45 or 49 as the case may be, the remainder of the plant being the same as before described with reference to fig.1. Each percolating tank is covered over, as shown, a man-hole door being provided in the cover and the pulp pipe 2, the gas pipe 55, and the solution pipe 29 may be arranged in the cover in the manner shown. t is the usual outlet.

In some cases a single agitator may be used as at fig.4 this agitator being similar in action to the agitator c of fig.1. Instead, however, of providing an air lift in this case a circulating arrangement may be provided the pulp within the agitator being forced by the admission of compressed air through the pipe 40 up the stand pipe u and out at its upper end where it strikes against a dome v and then falls back again into the pulp, the level of which is indicated at w. The pipe 40 is connected with an air compressor as usual and the gasses which are drawn off by the pipe 55 are carried to a gasometer or other suitable vessel and from thence to the air compressor (or they may be passed direct to the compressor) and re-passed through the pulp along with the air.

When the air and Cyanogen containing gases are drawn through the pulp instead of being forced therethrough, tanks, such as shown at fig.3 may be employed in lieu of the agitators, the gases being drawn off by a pump or other suitable exhauster through the pipe 55 and then, along with air, supplied to the pipe s from which they pass through the filtering bottom r and ore pulp, the Cyanogen containing gases being thereby caused to again act upon the ore.

(49)

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:-

1. The improvement in the Cyanide process for treating ores, consisting in collecting or drawing off the Cyanogen containing gases liberated during the treatment and bringing these gases again into contact with ore so as to act thereon.

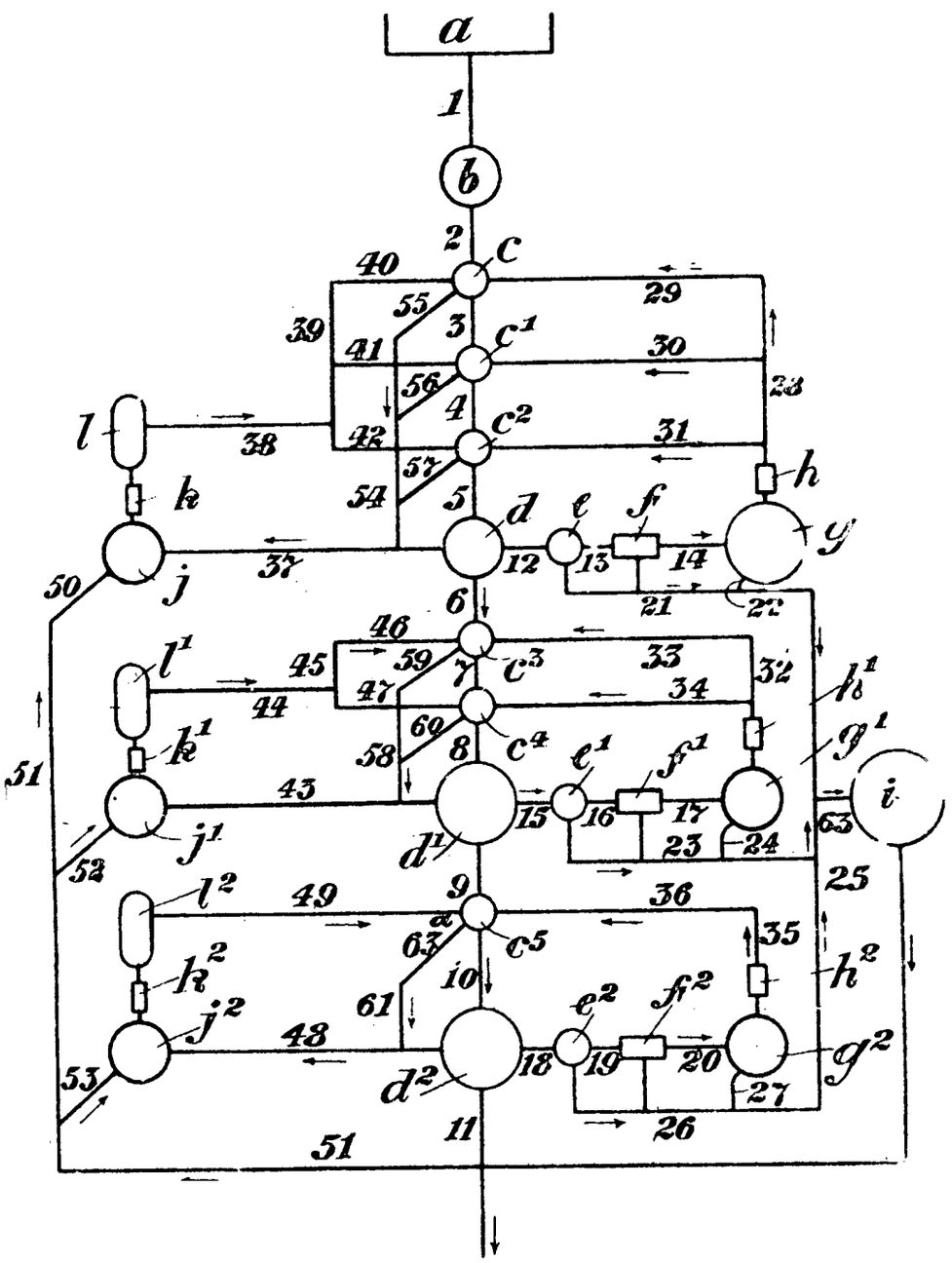
2. In the treatment of ores by the Cyanide process covering the vessels or places where the Cyanogen compounds in gas or solution are found, contained, or are used, in or for the process of extraction, and carrying off the gases from these covered vessels or places and thereafter returning these gases directly or indirectly back again to the agitators (or other vessels in which the ore is being treated) so as to again come in contact with the ore and act thereon.

3. In the treatment of ores by the Cyanide process covering the vessels or places where the Cyanogen compounds in gas or solution are found, contained, or are used, in or for the process of extraction, and carrying off the gases from these covered vessels or places and conducting them to one or more collecting vessels and then to a compressor or pump or equivalent whereby the gases are compressed said gases being then used either alone or in conjunction with air for agitating or aerating the ore pulp so that the Cyanogen containing gases are again brought into contact with the material on which they act.

4. The treatment of ores by the Cyanide process substantially as hereinbefore described with reference to the drawings annexed.

Hugo A. Leslie.

Fig. 1.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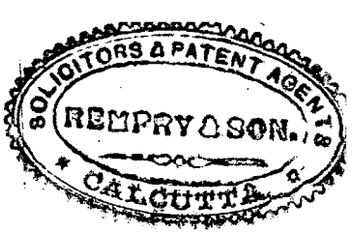

SOLICITORS & PATENT AGENTS
REMFRY & SON.
CALCUTTA

Fig. 2.

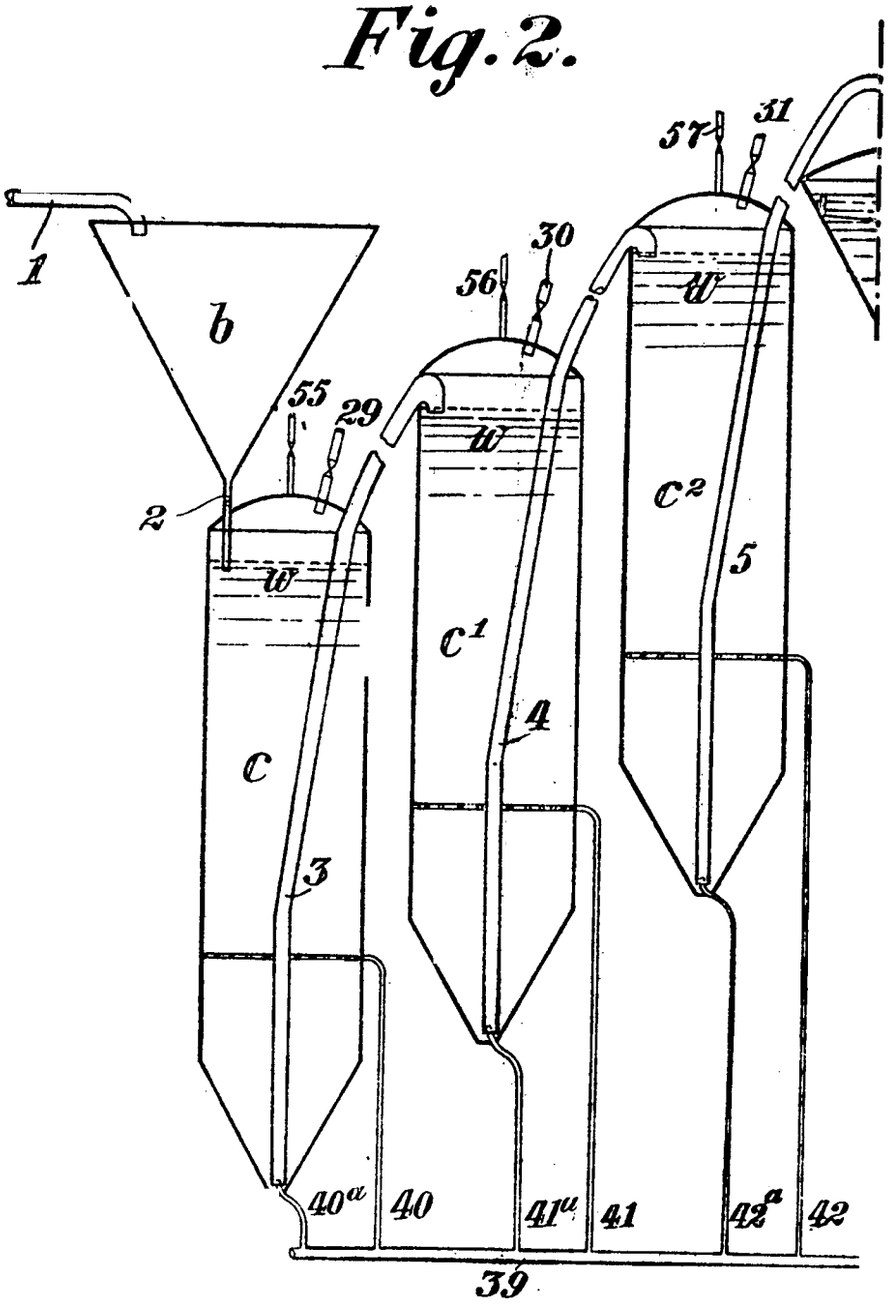
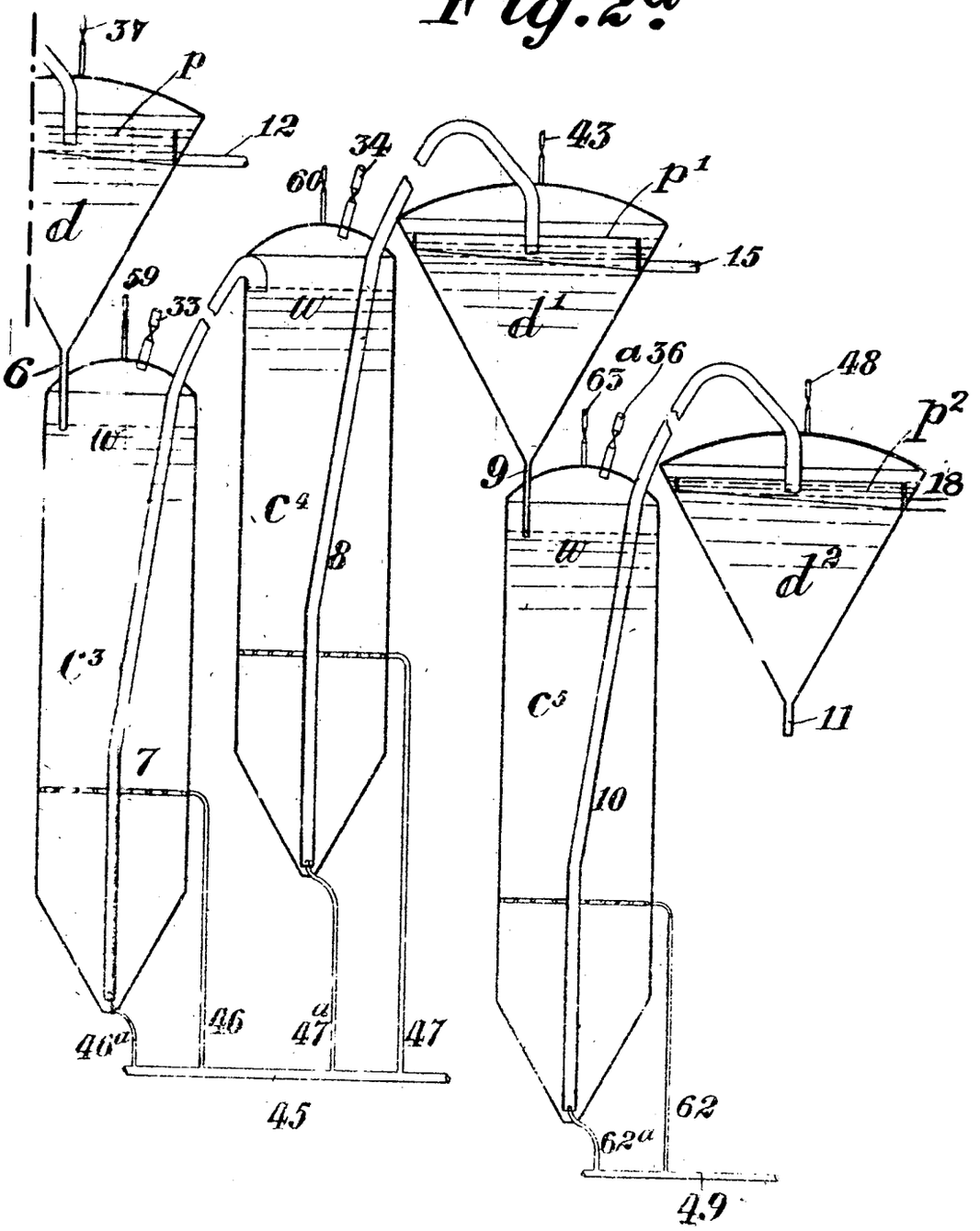


Fig. 2a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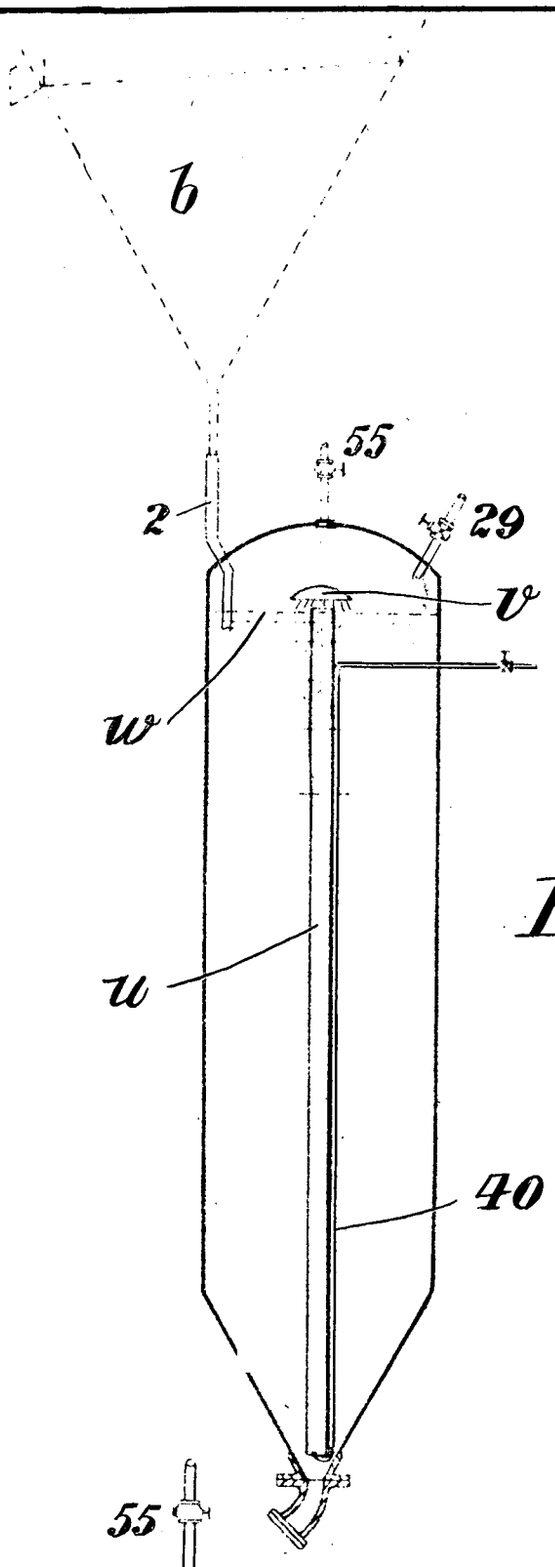

Fig. 4.

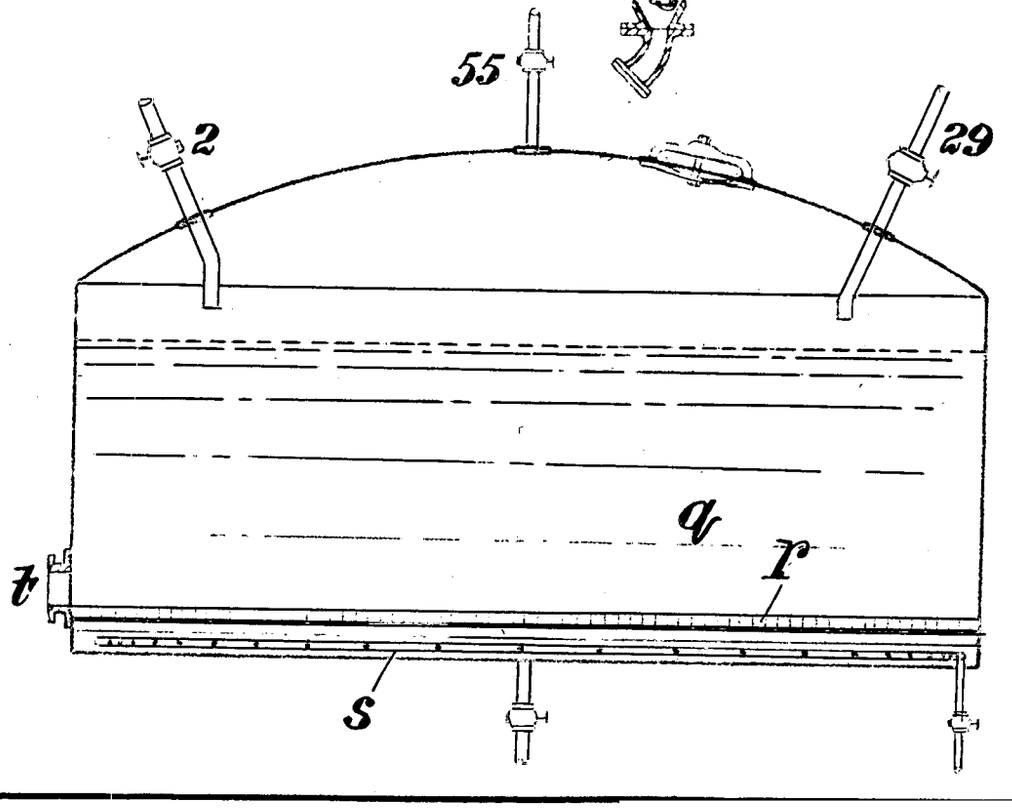

Fig. 3.

48

COUPON. *The remitter may write here any communication to the payee.*

Rs. 30 As. - re H.M.LESLIE. (Case A)
Mysore. No. 4/11-12.
(See our letter of date)
21-6-13

REMFRY & SON
Remitter.
17/6/13

To Rs 30 21-6-13

4.

2 4,

(49)

MYSORE GOVT. GEN. & REV. SECRETARIAT,

No. G. 296

Dated Bangalore, 11th July 1903.

G. M. 210-11-13

NOTIFICATION.

(PATENT.)

The following specification of an invention has been filed in accordance with Sections 8, 9, 10 and 11 of Regulation XI of 1894 (The Inventions and Designs Regulations) and is open to inspection at the Mysore Government Secretariat on application to the Secretary to the Government of His Highness the Maharaja of Mysore, General and Revenue Departments, and on payment of a fee of one Rupee.

By Mr Hugh Mackenzie Leslie, Metallurgical Engineer, of 53, Waterloo Street, Glasgow, Scotland.

"Improvements in the treatment of ores by the Cyanide Process."

By Order,

(Sd)

for Secretary.

To

The Compiler *Mysore Gazette*, for publication.

GPB—500—23-7-06.

4 Pats

(50)

No. G 297

S.R. 210-11-14

MYSORE GOVT. GEN. & REV. SECRETARIAT,

Dated Bangalore, 11th July 1913

From

The Secretary to the Government of H. H. the Maharaja of Mysore,
General and Revenue Departments.

To

Messrs. Remfry & Son,
Solicitors & Patent Agents, Calcutta

~~Sir~~, Gentlemen,

With reference to your letter dated the 17th June 1913, I am directed to forward copy of a Notification No. G 296 /Rev 210-11-13 dated 11th July 13, issued by this Government in regard to the invention filed by you under Regulation XI of 1894 (The Inventions and Designs Regulations.) and to request that the L.O. may be communicated to the party concerned.

The order granting permission to file specification is herewith returned, with the certificate at foot, duly filled in and signed.

I have the honor to be,

~~Sir~~, Gentlemen,

Your most obedient servant,

Sd/ [illegible]

for Secretary.

Money Cover sent Rs 30/-
dd
14-7-13

G.R.S. 29A]

19 . (57)

Received 21-7-13 Rs 30/-
& is in deposit

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To
The Deputy Commr.,
Treasury Deptt,
Bangalore

Dated

Despatched 11th July 13

Received

General No. G. 298

No. G.M. 210-11-15

Enclosure No. with Rs 30/-

Has the honor to forward herewith a sum of Rs 30/- (Thirty only) received from Messrs Rem and Son, Calcutta, being the fee payable under Schedule II cl (2) of the Mysore Inventions & Designs Regulation No XI of 1894 for filing a specification of an invention for "Improvements in the treatment of ores by the Cyanide Process" by Mr. Hugh mackenzie Leslie of Glasgow, and to request the favor of an acknowledgment for the receipt of the amount

By Order

SPV
For Secretary

GPB—20,000—24-10-10.

G.R.S. 29A]

19 .

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To (1) The Supdt, Govt Museum.
(2) The State Geologist.
(3) The Chief Engineer of Mysore.

Dated

Despatched 11th July 13

Received

General No. G. 299-30/
No. G. M. 210-11-16
Enclosure No. / each

Has the honor to forward herewith for record in his office copy of a specification of an invention for "Improvements in the treatment of ores by the Cyanide Process" by Mr. Hugh Mackenzie Leslie of Glasgow, and to request the favor of an acknowledgment.

By Order

For Secretary

GPB—20,000—24-10-10.

(53)

M.G.D. 193

MYSORE GEOLOGICAL DEPARTMENT,

DATED BANGALORE,...12th...July...1913.19 .

No. 158

DIARY No. 343

1913-1914
SECTION Gen. Misc.
FILE No. 210-11
ITEM No. 17.

FROM

DR. W. F. SMEETH, M.A., D.Sc., A.R.S.M., etc.,
State Geologist in Mysore.

To

K.R. Srinivasa Iyengar, Esquire, M.A.,
Secretary to the Government of His Highness
The Maharaja of Mysore, General & Revenue Depts:,
BANGALORE.

SIR,

I have the honour to acknowledge, with thanks, the receipt of a copy of a specification of an invention for "Improvements in the treatment of ores by the Cyanide Process" by Mr. Hugh Mackenzie Leslie of Glasgow, forwarded with your docket No. G 299-301/G.M. 210-11-16, dated the 11th July 1913.

I have the honour to be,
Sir,
Your most obedient servant,

W. Smeeth

State Geologist in Mysore.

GPB-300-28-3-13

(54)

No. 15

OFFICE OF ECONOMIC BOTANIST,
SUPERINTENDENT, MYSORE GOVERNMENT MUSEUM,

Bangalore, dated 14th July *1913.*

16. DIARY No. 418

1913-1914
SECTION Gen. Misc.
FILE No. 210-11
ITEM No. 18

FROM

G. H. KRUMBIEGEL, ESQ., F.R.H.S.,
Economic Botanist,
Superintendent, Mysore Govt. Museum,
Bangalore.

To

The Secretary to the Govt. of
H. H. the Maharaja of Mysore.
Gen. and Rev. depts.

Sir,

I have the honor to acknowledge
receipt of Copy of a specification
of an invention for "Improvement
in the treatment of ores by the
Cyanide Process" by Mr. Hugh
Mackenzie of Glasgow, forwarded
with your docket No. 4.299-310/G.M.
210-11-16, dated 11th July 1913.

I have the honor to be,
Sir,
Your most obedient servant

G. H. Krumbiegel
Superintendent
Govt. Museum

IKAR

1913–14.

From

G. H. KRUMBIEGEL, Esq., F.R.H.S.,
Economic Botanist,
Supt., Mysore Govt. Museum,
Bangalore.

To

The Secretary to the Govt of
H. H. the Maharaja of Mysore
Gen. and Rev. Dept

Dated 14th July 1913.

Despatched 16th "

Received

General No. 15

No.

Enclosure No.

Acknowledging receipt
of a copy of a specification
of an invention for —
"Improvements in the
treatment of ores by the
Cyanide Process" by Mr.
A. Mackenzie of Glasgow

GPB—5,75,000—6-4-12

DIARY NO. 583

55

No. 5913

1913-1914
Section Genl
File No. 270-11
Serial No. 19.

MYSORE P. W. DEPARTMENT,

CENTRAL OFFICE.

Bangalore, 22nd July 1913.

From

KARPUR SHRINIVASRAV, ESQ., B.Sc., L.C.E.,
Offg. Chief Engineer of Mysore,
Bangalore.

To

K.R.Srinivasaiengar, Esq.,M.A.,
Secretary to the Government of
His Highness the Maharaja of Mysore,
General and Revenue Departments.

Sir,

I have the honour to acknowledge, with thanks, the receipt of a copy of specification of an invention for "Improvements in the treatment of ores by the cyanide process" by - - - Mr.Hugh Mackenzie Leslie of Glasgow, received with your No. G.299-301/G.M.210-11-16 dated the 11th July 1913.

I have the honour to be,
Sir,
Your most obedient servant,

Deputy Chief Engineer,
Mysore P.W.Department.

S.S.

V
24/7 for

191 3.

MYSORE P. W. DEPARTMENT.

No. 5913

From

THE CHIEF ENGINEER OF MYSORE,
Bangalore.

To

The Secretary to Government,
General & Revenue Departments,

Dated Bangalore 22nd July 1913.

Despatched

Enclosure No.

SUBJECT.

Acknowledging with thanks the receipt of a copy of specification of an invention for "Improvements in the treatment of ores by the cyanide process" by Mr. Hugh Mackenzie Leslie of Glasgow.

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Genl Mis File No 210 of 1912
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Rs 30/-

Book No. 1044

DIARY No. 747 13

No 80

Bangalore Treasury dated 14-7-13 ICN Genl Mis

Received from Secretary to the Govt of Mysore Genl 210 Rs 30-0-0

Rupees Thirty only

20.

Annas — and Pies —

being on account of

fee in respect of an invention by

Mr Hugh Mackenzie

H. S. Ramaswami

In charge of Treasury.

Accd. Bangalore

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14/7/13

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